AN INTRA-AGENCY OVERVIEW

# MANAGING WISCONSIN'S NATURAL RESOURCES

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NATURAL RESOURCES COUNCIL OF STATE AGENCIES • 1973

## NATURAL RESOURCES COUNCIL OF STATE AGENCIES

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# PREFACE

The Natural Resources Council of State Agencies was created by Chapter 203, Laws of 1951, which is now identified as section 23.26 of the statutes.

The purpose of the Council is to promote the welfare of the State of Wisconsin by providing a method of collecting, analyzing and interpreting information and of making recommendations to the several state agencies and the Legislature on matters relating to the soils, waters, forests, fish, wildlife, and other natural resources of the state, and to provide a means whereby the several state agencies may better coordinate their efforts and activities in managing and regulating such natural resources and the protection, development and use thereof.



In March, 1971, the Council published a report on preserving and improving the quality of the air, land and water resources entitled QUALITY MANAGEMENT FOR WISCONSIN. The report in part or total was instrumental in the accomplishment by the Legislature and the several agencies of many of the more than one hundred recommendations it contained.

This publication is a second attempt to respond, in part at least, to the purpose of the Council doing so in the form of an updated interagency overview of activities associated with the management of the state's water, land and air resources. As in the first report, the overview is presented in a manner showing the past, the present and recommended future actions.

In sponsoring this publication the Council has brought together the expert knowledge of staff members from state and federal agencies engaged in the day-by-day management and surveillance of the state's natural resources. The Council itself did not perform an in-depth analysis of each section comprising this report. While the Council does generally endorse this overview, the specific comments and recommendations are those of the Council's water committee as arrived at by discussion of the material submitted by the resource contributors.

This second report expands the initial publication. Additional subjects included relate to planning for the use of resources, educational coordination, environmental impact, land resources concerns, natural beauty, natural areas and features of scientific and educational interest, and a section on wetlands which includes a Wisconsin Supreme Court landmark decision upholding the state's shoreland zoning program against a constitutional attack.

The reader is nevertheless reminded that this publication is not an exhaustive thesis on the many subjects it contains nor does it relate to all possible responsibilities in agency management of natural resources. For example, the report does not involve the natural resources concerns and practices in urbanized areas as extensively as it does in the rural environment. The Council will welcome constructive criticism in the interest of the preparation of future reports; each an improvement over its predecessor. Those readers desiring more information or explanation relating to any one section should contact the committee's chairman, H.E. Wirth, Box 309, Madison, Wisconsin 53701, or the program agency or agencies identified in each section. The writing was completed in 1972.

The conservation of natural resources is the concern of all the people. The best means of effecting conservation of natural resources is by popular understanding and cooperation through education and persuasion. It is hoped that this publication will be of aid in such education.

*The Natural Resources Council of State Agencies*

# ACKNOWLEDGMENTS

This report is the work of staff members from state and federal agencies and the University of Wisconsin. Resource contributors, identified at the beginning of each chapter, submitted preparations in accord with the established seven-part outline to the NRCSA Water Committee for review and editing. In this process, the committee in many cases made substantial additions or revisions to both content and the recommendations.

Guidance and advice in the preparation of this report for publication was expertly extended by Ruth L. Hine, Chief, Research Reporting Section, Department of Natural Resources. Mrs. Donna Voramwald, Department of Health and Social Services, administrative secretary to the committee chairman, efficiently performed many details throughout the course of the committee's assignment. Without their assistance the committee would indeed have had difficulty in finalizing the charge as received from the Council.

With grateful acknowledgment to all who have helped, and to the Department of Natural Resources which made this publication possible, this interagency overview on MANAGING WISCONSIN'S NATURAL RESOURCES is respectfully submitted.

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*"Nature streaming into us, wooingly teaching her wonderful glowing lessons . . . every wild lesson a love lesson, not whipped but charmed into us. Oh, that glorious Wisconsin wilderness!"*

*John Muir*

## THE PLANNING, EDUCATION, AND ENVIRONMENTAL IMPACT EVALUATION

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# PLANNING FOR THE USE OF WISCONSIN'S RESOURCES

## *What Has Been Done*

Wisconsin became a state almost 125 years ago, when 20 miles was a full day's travel and the lands, waters, and forests appeared to be endless–and hostile. The general rule of "resource management" was exploitation–use and move on–there was more to be found over the next hill.

The early resource decisions in Wisconsin resulted in major changes to the character and quality of the resource base. The virgin forests of mature pine and hardwoods–once covering 3/4 of the state–have been essentially "logged off." The native fisheries of the lakes and rivers have been greatly depleted. Erosion has removed the topsoil from thousands of acres, contributing sediment to many waterways. And, in many places, inadequate management of society's wastes–domestic, industrial, and agricultural–has polluted Wisconsin's waters.

For the past 50 years, Wisconsin, other states, and the nation have attempted to address and correct many of the problems which have developed from changes in the resource base. In the late 1920's Wisconsin, along with many other states, adopted most of the model planning and zoning statutes proposed by the federal government. This legislation paved the way for instituting a planning process as a legitimate function of government–at least at the local level. It soon became apparent that planning was an equally legitimate function for state government and, in response to the activities of the National Resources Planning Board (NRPB), Wisconsin established a State Planning Board in the 1930's to provide overall direction for the development of the state and the functions of state agencies.

The cause of statewide planning, and planning generally, was temporarily set back with the demise of the NRPB and the beginning of World War II, as more urgent matters dominated public concern. Programs of the postwar period resulted in rapid expansion of our urban areas, greater mobility for the general population, rapid economic growth, and a beginning recognition of the impact of these activities on Wisconsin's resoure base. In 1951 the Legislature created the Natural Resources Council of State Agencies (NRCSA) to coordinate resource-related activities of the various state agencies.

Recognizing that resource management was just one of several functions of state government and was intimately related to all development activities, in 1959 the Legislature established the Department of Resource Development (DRD)–a planning agency to coordinate planning in the other state agencies, to assist local governments in their planning efforts, and to institute a comprehensive planning process within the whole of state government. An overview perspective of Wisconsin and its regions–the people, activities, resources, and potentials–as a framework for agency programs and planning efforts was first developed. The primary thrusts of initial planning efforts were fostering economic development in Wisconsin and protecting the state's resources.

During this time the Legislature passed the original Outdoor Recreational Act Program (ORAP) legislation which created a greatly accelerated program of land acquisition and development of outdoor recreation facilities for state and local governments. An outdoor recreation planning process, while adjusted to satisfy the requirements of federal funding programs, is still an active ongoing function of state and local governments. This same period saw the establishment of several regional planning commissions in Wisconsin, including the nationally recognized Southeast Wisconsin Regional Planning Commission. The regional commissions, drawing on the resources of many individual local governments, have developed a planning capability which no single government would be able to support and which has given perspective to the actions of individual jurisdictions.

The Wisconsin Water Resources Act of 1965, among other things, requires county and municipal governments to zone their floodplain and shoreland areas in accordance with state standards. Such zoning recognizes the hazards and limitations for development in such areas and, because of the intimate relationships of these lands and surface waters, serves to protect Wisconsin's water resources. Partly as a result of this requirement, many counties–within RPC's and individually–have established their own planning agencies which are providing valuable information, services, and advice to citizens and governments alike.

In 1967, as part of a general reorganization of Wisconsin state government, the Department of Administration became the comprehensive state planning agency, the Department of Local Affairs and Development was assigned the functions of assistance to local and regional planning agencies.

Several changes at the federal level have had significant effects on planning and resource management activities in Wisconsin. The creation of a series of resource-related categorical giant programs for such activities as water pollution control, air pollution control, land and water conservation, fish and game management, and interstate highway construction, has resulted in the creation of categorical plans. Plans for outdoor recreation, water resources, natural resource management, wildlife management, highways, airports, and other functional pieces of a total state plan are completed or in process.

In 1970, the federal government established the A-95 review process, to review and comment on projects which involve federal funding. State and regional clearinghouses have been established to analyze local and state projects for their compliance with state and regional policies and plans. The enactment of the National Environmental Policy Act (NEPA) added the critical element of environmental impact to this review process.

## *Problems*

Responding to resource concerns which emerge from an accelerating rate of change in Wisconsin has resulted in a system which was created incrementally. The problem-by-problem approach to resource management has left several gaps and has caused duplications and inconsistencies which hamper our efforts to assure future Wisconsinites of an adequate resource base.

1. There is still a lack of an overall state development policy—one which is sensitive to environmental protection needs and land use concerns. While many pieces of such a policy have been developed, the whole has not yet been created.

2. Many individual state policies contradict and cancel each other in the areas of resource management and land use. Of particular concern are the counter effects of our taxation system and land use controls. Similarly public health and pollution abatement policies can contradict land use and resource management goals. For example, malfunctioning septic tanks in a flood plain area may create a public health hazard, requiring the construction of sewers to serve the area—but the sewers encourage further development of the flood plain and thereby exacerbate the flood control, wildlife management, and water quality problems associated with development.

3. Regional planning agencies, as presently constituted, lack the authority to implement their plans. Funding and authority are inadequate. Many of Wisconsin's regional planning commissions (RPC's) have just recently been established and have not yet developed the expertise and experience necessary to do comprehensive or resource management planning.

4. There is an inadequate base of information on which to predicate many resource management decisions and planning activities. Of priority concern are topographic base maps, detailed soil surveys, hydrologic surveys, and geologic inventories. In addition we need to develop systems to effectively use existing and new information.

5. At present there are inadequate arrangements for relating the environmental and resource aspects of individual planning efforts to each other. There is a lack of common direction, goals, standards and terminology.

6. Urban and suburban development patterns that are destructive of resources and are inefficient users of land continue to sprawl throughout the countryside, with no effective means of control.

7. There are inadequate means for implementing public plans and policies and for molding individual activities and programs into conformity and support of plans.

## *Laws*

1. City, village, town and county planning and zoning enabling powers: Sections 59.97, 60.74, 61.35, and 62.23, Wisconsin Statutes.
2. State and regional planning enabling powers: Sections 16.95, 22.14, and 66.945, Wisconsin Statutes.
3. Floodplain-shoreland zoning powers: Sections 87.30, 59.971 and 144.26, Wisconsin Statutes.
4. Subdivision control powers: Chapter 236, Wisconsin Statutes.
5. Official map enabling powers: Section 62.23, Wisconsin Statutes.
6. Eminent domain powers: Chapter 32 and Section 23.09 and 27.05, Wisconsin Statutes.
7. Airport and airport protection powers: Section 114.135 and 114.136, Wisconsin Statutes.
8. Soil and water conservation district land use powers: Chapter 92, Wisconsin Statutes.
9. Municipal incorporations and annexations: Sections 66.014, 66.016 and Section 66.021, Wisconsin Statutes.
10. Natural Resources Council of State Agencies: Section 23.26.
11. Wisconsin Environmental Policy Act: Chapter 274, Laws of 1971.

Certain principle federal laws are listed as follows. A number of other applicable laws are noted in subsequent sections of this report.

1. Public Works and Economic Development Act: Public Law 91-304.
2. Rural Development Act: Public Law 92-419.
3. Water Pollution Control Act: Public Law 92-500, amended 1972.
4. National Coastal Zone Management Act of 1972.
5. Housing and Urban Development Act: Public Law 91-609, Public Law 92-213.
6. Watershed Protection and Flood Prevention Act: As amended.
7. National Environmental Policy Act: PL 91-190.

## *Regulations*

1. Wisconsin floodplain-shoreland management programs: Chapter NR 115 and NR 116, Wisconsin Administrative Code.
2. Solid waste disposal: Chapter NR 151, Wisconsin Administrative Code.
3. Solid waste management planning: Chapter LAD 3, Wisconsin Administrative Code.
4. Subdivisions not served by public sewer: Chapter H 65, Wisconsin Administrative Code.
5. Land subdivision plats abutting state trunk highways and connecting streets: Chapter HY 33, Wisconsin Administrative Code.

Examples of other alternatives to influencing land use change which are not explicitly in the categories of land use laws or regulations are the easement and fee simple acquisition programs established by the original ORAP legislation and the program of preserving recreational lands by the ORAP–200 legislation.

## *What Is Being Done*

In addition to the ongoing planning activities in the various state, regional, and local agencies, several things are happening within the state and state government which could potentially mitigate many of the problems we are now facing.

In June of 1972, Governor Lucey initiated an effort to formulate a set of rational policies to guide the future development of Wisconsin–together comprising an integrated comprehensive state development policy. In launching this effort, the Governor declared, "If we had a development policy, it would be possible to envision a future day when ... the decay of our cities and our rural areas would be arrested and reversed, the haphazard sprawl that bleeds our cities and despoils our countryside would be effectively controlled, the physical environment we and future generations depend upon for health, comfort and even survival would be wisely husbanded and managed ..."

The responsibility for accomplishing this was assigned to the Bureau of Planning and Budget in the Department of Administration. The BOPB has divided the task into three major components: Determining where and how people want to live in Wisconsin; fostering economic development by determining the most suitable and feasible industries for Wisconsin and pinpointing the steps necessary to attract and maintain them? and, promoting environmental balance by cataloging the state's resources and their capabilities to be used so that they can be wisely managed. The Governor called for "... a clear basis for reordering our priorities," by January 1974.

Governor Lucey recently directed DLAD to review and recommend changes to present planning laws, particularly in regard to RPC's. This study is nearing completion, and legislation is being prepared to strengthen the capacities of regional planning agencies to prepare and implement comprehensive regional plans.

During the last several years there have been significant efforts in creating RPC's. As of early 1973, only 11 of Wisconsin's 72 counties were not involved in regional planning, and several of these are included in pending petitions for the creation of new commissions. The most recently created RPC's are not yet capable of providing a full range of services to their member governments, but changes in structure and funding should accelerate the development of the necessary capabilities.

Several pieces of legislation recently enacted or pending in Congress have important impacts on resource management and protection in Wisconsin. Among these are the Coastal Zone Management Act, the Rural Development Act, and the Federal Water Pollution Control Act. These acts recognize the importance of certain resources and land areas, impose performance requirements on state governments, and provide states with funds. The National Land Use Policy and Planning Act would provide additional financial and program support for a comprehensive state land use planning and management program.

The 1971 session of the Wisconsin Legislature, enacted the Wisconsin Environmental Policy Act, requiring environmental studies for the activities and projects of state agencies. At present, an interagency committee is developing guidelines to implement the act. Many government activities which previously were not sensitive to resource considerations now have to develop and consider environmental impact statements before decisions are made.

The state has, in recent months, begun to address long recognized resource information deficiencies. Two potentially major efforts currently underway in the Department of Administration are the Critical Resources Information Program (CRIP) to identify, evaluate, catalogue, and monitor those resources and areas which are particularly important to Wisconsin's environmental quality and future development; and the Wisconsin Land Use Information System which will relate all existing land use information to a common geographic base and institute the collection of additional information.

While the awareness of environmental quality and resource management problems has generally increased over the past several years, certain aspects of these concerns have emerged as having major significance. Because of their importance, the Governor established several task forces to directly address these particular problems in depth. The Solid Waste Recycling Task Force, the Citizens Study Committee on Metropolitan Problems, the Timber Management Policies Review Committee, and the Land Resources Committee are all in the process of developing and publishing their final reports and recommendations. Of particular significance is the work of the Metro Study Committee–because major environmental and resource problems result from continuing urban development and expansion in metropolitan areas–and the Land Resources Committee, which has examined the land use decision-making process and developed proposals to provide a means whereby the state can influence and direct land use decisions where critical statewide environmental concerns are involved. Each of these task force efforts will be introduced into the Legislature for action.

A program in progress in DNR to develop a Water Resources Plan is intended to look at Wisconsin's water resources and establish an overall perspective and direction for future water management activities. Information developed in the completed river basin studies–which focus primarily on water quality and pollution abatement needs–will be an important input to the Water Resources Plan. A second effort takes a broader look at all of Wisconsin's resources: developing goals, objectives, priorities and strategies for the management of the full range of resources.

## *What Is Not Being Done That Should Be Done*

Among the resource planning needs which are not currently being addressed but which are of high importance include the following:

1. Wise natural resources and land use planning and management requires a broad base of facts on these resources. Such a base does not now exist. Greater emphasis and support should be given those activities directed at development of this information, especially in areas of intense land use conflict.

2. A method and framework are needed to better interrelate and integrate the planning and management efforts which are focused on individual natural resources such as water, forests, minerals, wildlife, land farms and soils. This is necessary to eliminate the inconsistencies, duplications, and gaps currently being experienced.

3. Environmental and resource management concerns must become more fully integrated into comprehensive planning at all levels. A stronger, more direct link between state and local programs should be instituted by developing and strengthening regional agencies and by improving the status and importance of regional plans.

4. Past resource management and protection efforts have relied almost exclusively on controls exercised through the police power. We need to develop positive methods to guide development and encourage the best use of land in addition to excluding the worst land use practices.

5. Changes and adjustments to the tax system–particularly property taxes–which are necessary and desirable to reinforce and support environmental/land use/resource management goals is needed. Present tax policies frequently work to negate efforts to control land use and development.

6. The basic question of whether we in fact wish to have continued uncontrolled growth in Wisconsin is not being seriously addressed. Other resource rich states like Oregon and Colorado have concluded that growth must be curbed, for continuance will increase deterioration of their resources.

## *Recommendations*

1. The comprehensive planning process should be strengthened at both the state and regional level. This should be accomplished by formalizing the process, and requiring that individual programs and regulations are in compliance with adopted plans and policies.
2. The current state development policy planning efforts should be carried to the completion of the first phase as rapidly as possible and should be continued into subsequent stages which would focus on additional issues and on greater depth investigation and analysis.
3. Current efforts to coordinate, collect, consolidate, analyze, and disseminate resource information should be broadened and accelerated. Major increases in funds and staff for these activities should be provided in coming years.
4. State policies, statutes, and regulations relating to municipal boundaries should be reviewed and adjusted toward making political jurisdictions more rational and consistent with the areas affected by environmental issues.

# EDUCATIONAL COORDINATION

## *What Has Been Done*

In February 1970 the Department of Public Instruction, the Department of Natural Resources and ten organizations with an interest in environmental education cooperated in conducting a Governor's Conference on Environmental Education. School district administrators and university staff involved in preparing teachers in environmental education were invited to the conference. The participants developed nineteen recommendations which urged state agencies and educational institutions to develop environmental education materials and programs and to better prepare teachers to deal with environmental issues and problems in the classroom.

During the same month the U.S. Office of Education identified environmental education as a high priority item and urged state education agencies to do likewise.

In response to those urgings, an ad hoc committee was formed to develop a state plan or commitment for environmental education. The work of this committee terminated in the drafting of a proposed Wisconsin Environmental Education Act based upon Public Law 91-516, the federal Environmental Education Act, enacted in fall of 1970. Wisconsin's version was submitted to Governor Patrick Lucey's Environmental Task Force in early 1971, endorsed in spirit, and submitted to the Governor as part of the Task Force's report. As a result, Governor Lucey, on May 17, 1971 issued Executive Order No. 18.

That order created the Wisconsin Environmental Education Council and directed it: to develop a state plan for environmental education, to provide technical assistance to agencies and citizen groups in developing programs, to assist in the broad coordination of environmental education activities in Wisconsin, to implement activities required by statute, and to recommend changes in the statutes. The Council appointed an executive secretary and a broadly representative advisory committee, which is engaged in the preparation of an environmental education plan for Wisconsin.

State agencies and institutions, such as the Department of Natural Resources, the Department of Public Instruction, the Department of Agriculture and the University of Wisconsin including the Wisconsin Geological and Natural History Survey, have published many bulletins dealing with environmental topics. Those have been widely distributed to the public.

Wisconsin has long promoted learning in the out-of-doors. At least 370 outdoor laboratories have been developed by school districts. Thousands of school children utilize the facilities for first-hand experiences in a natural environment. Additionally, the National Audubon Society operates a summer camp near Sarona, and Trees for Tomorrow, Inc. has offered instruction in the conservation of natural resources to nearly 100,000 persons since it was founded in the mid-1940's. The University of Wisconsin offers field instruction at a number of facilities including the Pigeon Lake Camp near Drummond, Camp Upham Woods near Wisconsin Dells, and the Chippewa Lake Field Station near Clam Lake. The MacKenzie Environmental Education Center at Poynette, operated by the Department of Natural Resources has a national reputation for its efforts.

Academic programs involving environmental studies have developed at all campuses of the University of Wisconsin. Examples of major programs include the University of Wisconsin–Green Bay, where an environmental focus guides the entire program, the large College of Natural Resources at UW–Stevens Point, and the Institute for Environmental Studies and Center for Environmental Communications and Education Studies at UW–Madison. At some other institutions effort is limited to a few courses. The University of Wisconsin–Superior and the Department of Public Instruction are cooperating in a statewide inservice environmental education program. Several private colleges also have noteworthy environmental programs, including Beloit College and the Sigurd Olson Institute for Environmental Studies at Northland College.

The Wisconsin Board of Vocational, Technical and Adult Education offers environmental programs at its Fox River Valley Technical Institute Campus at Oshkosh and the Nicolet College and Technical Institute at Rhinelander. In addition, efforts are underway to integrate environmental concepts in all instruction in the system.

The Departments of Natural Resources and Public Instruction both employ environmental education specialists who work with schools, institutions of higher education, and other organizations and agencies in developing environmental education programs.

The Education Committee of the Natural Resources Council of State Agencies was responsible for the publication of The Natural Resources of Wisconsin during the 1950's. This publication subsequently appeared in a revised form as a part of the 1964 Wisconsin Bluebook. Over 17,000 reprints of this Bluebook section have been distributed as a basic reference on environmental resources.

Many hundreds of statewide and local organizations have evolved to deal with environmental problems. Some consider specific problems, some environmental problems in general, and some are consortia of organizations of these two types. A few deal entirely with environmental education while the others have an educational component in their programs.

Wisconsin has been the scene of two prominent national environmental education conferences held in Green Bay. They were co-sponsored by the University of Wisconsin–Green Bay, the National Audubon Society, the U.S. Office of Education, the Depart-

ment of Public Instruction, Cooperative Educational Service Agencies 3, 8 and 9, the Conservation Foundation and the Wisconsin Environmental Education Council. In the first conference, national leaders in environmental education were assembled to discuss strafor furthering environmental education development. In the second conference they discussed the role of higher education in environmental education.

## *Problems*

A fundamental problem which must be solved if environmental quality is to be maintained and improved is an educational one. Education must help citizens, governmental leaders, environmentalists, and indeed everyone, break down their narrow perception of environmental problems, to examine environmental problems from all aspects—social, political, cultural, economic, esthetic and scientific. It must help people examine their own attitudes and values so their life-style begins to reflect an understanding that man is a part of nature and not separate from it. Four areas in which considerable attention must be focused in order to achieve improvements are:

1. Teacher preparation—The preparation of teachers to deal with environmental studies in the classroom needs considerable additional attention. Only those teachers to be certified or licensed to teach social studies or science are required to receive instruction in environmental matters, and many of the programs designed to do so are out-dated.

2. Educational program development —High quality materials which aid schools in the preparation of educational programs need to be developed.

3. General Adult Education—Despite the abundance of popular publications and mass media presentations dealing with environmental matters, the general public is still poorly prepared to understand the significance of certain kinds of actions which may have a detrimental effect. The complexities of conveying information are partly responsible. Additional attention must be devoted to the development of techniques and materials to convey information to the general public.

4. Special Problem Education—As specific environmental issues and problems arise, for example, nuclear power plant siting or Project Sanguine, the public needs to be presented with all aspects of such problems. Public understanding is essential if citizens are to be able to participate significantly in decisions resolving these issues and problems.

## *Laws*

The following Wisconsin Statutes deal with environmental education as indicated:

1. Section 37.29 requires teacher preparation institutions to offer "adequate and essential instruction" in conservation of natural resources.

2. Section 118.01(1) and 118.01(8) require that elementary schools, high schools and schools of vocational, technical and adult education provide instruction in the conservation of natural resources.

3. Section 115.31(5) directs the Department of Public Instruction, the Dean of The College of Agricultural and Life Sciences at the University of Wisconsin–Madison and the Department of Natural Resources to cooperate in the preparation of outlines and lists of materials for teachers in the courses offered under SS 37.29 and 118.01.

4. Section 118.19(6) requires "adequate instruction in the conservation of natural resources" for teachers certified or licensed to teach courses in science or social studies.

5. Section 121.02(1)(d) requires compliance with the above statutes in order to be classified as a basic aid district. Section 121.02(2)(a) and (d) require the same compliance plus "instruction in the conservation and wise use of natural resources in both elementary and high schools" in order to be classified as an integrated aid district.

6. Sections 28.20 and 118.05 allow municipalities, including school districts, to establish and operate community forests and conservation camps.

A federal statute, Public Law 91-516, The Environmental Education Act, created an office of Environmental Education within the U.S. Office of Education, Department of Health, Education and Welfare; created a National Advisory Council on Environmental Education, and authorized funding for the development of environmental education materials and programs for all citizens.

## *Regulations*

Wisconsin Administrative Code, Rules of the Department of Public Instruction, Licenses, Chapter P.I. 3.03 (Licenses), (4) High School (a)5.

## *What Is Being Done*

The Wisconsin Environmental Education Council is completing a study of environmental education in the state which will result in the identification of needs and in recommendations to meet them. The Council's Advisory Commiteee has identified twelve sector-audiences which are involved or should be involved in environmental education. Those sector-audiences are elementary and secondary education; vocational, technical and adult education; higher education; federal, state and local agencies; youth groups; citizen action groups; private natural resource interest groups; service, fraternal and religious groups; agriculture; industry; labor; and mass media.

The Advisory Committee is collecting information dealing with (1) the environmental education activities, (2) the environmental education needs which must be fulfilled in order to reach established goals, and (3) types of programs which will fulfill those needs, for each sector-audience. From that information a statewide plan will be formulated dealing with the status of environmental education, and the urgent needs of the state in respect to environmental education, recommending programs to meet those needs, and finally offering some strategies to help implement priority programs. The objectives are to improve the awareness and understanding of all

citizens of the State's environmental resources and problems and to motivate them to seek solutions.

## *What Is Not Being Done That Should Be Done*

1. Wisconsin Statutes which deal with instruction in the conservation of natural resources have not been updated to reflect a broader total environment viewpoint.

2. There is no statewide effort to develop materials and programs for general adult or specific problem education.

3. Legislation has not been introduced to authorize the Wisconsin Environmental Education Council which now exists by Executive Order.

## *Recommendations*

1. Wisconsin Statutes dealing with instruction in the conservation of natural resources should be updated to reflect a broader total environmental viewpoint. The Wisconsin Administrative Code, where it pertains to existing environmental educational statutes, needs a similar revision.

2. The Wisconsin Environmental Education Council should be officially established legislatively. Consideration should be given to its relationship to the Natural Resources Council of State Agencies.

3. State financial support for the development of programs and materials dealing with the priorities identified by the Wisconsin Environmental Education Council, including teacher preparation programs, environmental education materials, general adult education, and special environmental education, should be provided.

A plan for environmental education in Wisconsin, now being formulated by the Environmental Education Council, will contain more detailed and specific recommendations, establish priorities, and propose steps toward implementation.

# ENVIRONMENTAL IMPACT

## *What Has Been Done*

During the last decade a broad public awareness has developed regarding the quality of the environment in which man lives. Historically, man has always recognized the necessity of a quality environment, but the recent awareness is one of recognizing the complex interactions between environmental quality, other social requirements, and economic requirements of present and future generations. Because of the limitation of resources, the rapid increases in population, high density urbanization, industrial expansion, and new and expanding technological advances, the competing requirements of society cannot be considered separately.

The complexities and interactions of the environmental and social issues created a need for a systematic approach to problem identification and problem solving. Because many governmental agencies are directly involved in environmental issues but only in the limited manner, an approach was required to coordinate the effort of identification and solution of environmental problems in a manner consistent with the other functions of the agencies involved. Both the federal and state legislative bodies responded to this need by the passage of the National Environmental Policy Act and the Wisconsin Environmental Policy Act.

As stated in the Wisconsin Environmental Policy Act the purpose of this legislation is "to declare a policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and to stimulate the health and welfare of man; and to enrich the understanding of the important ecological systems and natural resources". This legislation declared the policy "to use all practical means and measures including financial and technical assistance in a manner created to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and to fulfill the social, economic and other requirements of present and future generations". This legislation also stated that it is the "continuing responsibility of this state to use all practical means, consistent with other essential considerations of state policy, to improve and coordinate plans, functions, programs and resources to the end that the state may" among other things:

1. "Assure safe healthful productive and pleasing surroundings".

2. "Attain the widest range of beneficial uses of the environment while attempting to minimize degradation, risk to health or safety, or other undesirable and unintended consequences".

3. "Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources".

In summary the procedure defined in environmental impact legislation is a process which permits interaction of various agencies whose specific functions are narrow in scope. It is a process that allows the broadest range of variables and viewpoints to be included or discussed before a decision is made. This procedure allows for the weighing of the benefits and costs of various alternatives as to their environmental, social and economic impact. Environmental impact statements are the first step in making an "optimal" decision through the inclusion of many diverse factors.

Subsequent to the signing of the Wisconsin Environmental Policy Act the Governor directed the Department of Administration to establish in connection with other state agencies guidelines for use in the administration of the act as it relates to environmental impact statements. These guidelines were developed and address themselves to various aspects of the preparation of environmental impact statements. Specifically, a two stage procedure is required for environmental impact statements. The first stage consists of a draft statement circulated to all affected agencies for comments. Upon receipt of these comments and after an environmental hearing, the final statement is to be prepared by the lead agency.

## *Problems*

1. There has been some confusion as to when an environmental impact statement should be required, i.e., what is "a major action significantly affecting the human environment"?

2. It is currently unclear as to if the law applies to local governmental units. The term "agency" needs to be defined through further legislative or court action.

3. No determination has been made as to what extent can state agencies pool their resources in projects requiring more than one statutory permit or approval.

4. The amount of detail that is required in an environmental impact statement for various projects has not been delineated.

5. There is no stated position in state agencies as to when in the planning of the project must the environmental impact statement be made.

6. Some state agencies are not sure if they are required to make their own impact statement when an applicant provides one.

7. The role of the environmental impact statement in the legislative process has not been defined.

8. State agencies have not defined to what extent they should "study, develop and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternate uses of available resources" and

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regulations, laws, what is being done, problems, what is not being done that
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"initiate and utilize ecological information in planning and developing of resource projects" as prescribed by the Wisconsin Environmental Policy Act.

## *Laws*

Federal

Public Law 91-190, the National Environmental Policy Act of 1969, initiated the concept of environmental impact statements on a federal level.

State

Chapter 274, Laws of 1971, the Wisconsin Environmental Policy Act, requires and broadly describes the procedure of environmental impact statements as related to all state agencies. Chapter 273, Laws of 1971, authorizes the Department of Natural Resources to require an applicant for any permit or statutory approval which the Department may grant, to submit an environmental impact report if the area affected exceeds 40 acres or the estimated cost of the project exceeds $25,000.

## *Regulations*

Guidelines established by Council on Environmental Quality (36 F.R. 7724, April 23, 1971) for the implementation of the National Environmental Policy Act of 1969.

## *What Is Being Done*

Twenty state agencies consider themselves affected by the Wisconsin Environmental Policy Act. Seven of these have developed or are developing guidelines in addition to those prepared by the Department of Administration. Three agencies have prepared and published extensive guidelines to assist in the preparation and review of environmental impact statements.

A committee has been formed at the request of the Governor to evaluate and coordinate state agency efforts and to clarify the requirements of state agencies as to developing procedures and criteria to implement the intent of the Wisconsin Environmental Policy Act. This committee will also study the record of compliance of the state agencies and determine what agencies should be preparing impact statements. Further, the committee is to review the relationship between environmental impact statements and land use planning so as to insure adequate coordination of long range or area wide goals.

Various state agencies are currently preparing or requesting preparation of environmental impact statements for projects which are considered major actions. Due to the newness of the Wisconsin Environmental Policy Act, no assessment of the effectiveness of individual agencies can be made at this time.

## *What Is Not Being Done That Should Be Done*

1. The intended level of interagency

## *Recommendations*

1. To increase interagency cooperation, specific procedures should be developed for the preparation of environmental analysis of each type of project or policy. These procedures should be initially developed by the agency concerned and then should be forwarded to all other agencies that conceivably might be concerned with the particular project or policy. Through interagency cooperation specific procedures and guidelines should be developed to insure adequate interagency review. Items that should be considered in these specific procedures and guidelines are:
   a. Type of information that should be developed and in what detail.
   b. Stage at which the impact statement should be developed.
   c. Type of information or expertise that is required from other agencies.
   d. Priority or relative importance of this type of project.
   e. Existing and developing long range plans.
2. To insure completeness of the specific guidelines, each set of guidelines should be circulated to all state agencies for their review and comments.
3. To resolve conflicts resulting during the review of the specific guidelines, the Environmental Impact Statement Coordinating Committee recently established by the Governor should accept the responsibility of coordinating and finalizing the specific guidelines. To insure efficient implementation of the Wisconsin Environmental Policy Act in future years, this committee should be formalized within the governmental structure.
4. Agencies should, on a continuing basis, review the effectiveness of the impact statements which their agency may develop or require. Questions that should be answered are:
   a. Are priority areas being considered?
   b. Do the impact statements provide the necessary information

*Continued on page 16*

communication which is prescribed in the legislation is not being carried out. Interagency communication is particularly lacking in:

a. The type of information and the detail of information to be developed in an environmental impact statement when the project in question involves multiagency review or permits;
b. The types or classes of projects and policies that have interagency interests and to what degree;
c. The timing of the development of an impact statement in projects involving interagency cooperation; and
d. The determination of which actions are in the category of having nonsignificant impact.

2. It must be recognized that there is limited funding for environmental review. However, agencies have not defined priority projects so that the limited efforts available can be concentrated on the important projects or policies. Procedures must be developed to minimize the costly and voluminous statement process as currently evolved and to resolve the environmental conflicts at the earliest possible point in time.

3. Environmental impact statements should be prepared for two levels: (a) the planning or policy level, and (b) the design or project level. At the present time the primary focus of environmental impact statements is on individual projects rather than broader agency actions which involve agency policy. Many agencies, for example, develop policies and codes regarding the review or regulation of various types of projects. An impact statement on these review procedures or regulatory processes may have greater benefit than the development of an impact statement on each individual project. This is particularly true when the funding for the environmental review is limited and the number of projects large. Also, a wider range of alternatives is usually more available at the policy level than at the project level.

4. Many projects which will require environmental impact statements affect the interests of more than one agency. Yet, the expertise of each of the affected agencies is not being used to develop the impact statement.

5. The concept of a draft statement followed by a final statement is good; however, state agencies have not utilized this concept as a means of providing an adequate and timely exchange of information on a proposed policy or project.

6. There is a lack of uniformity and interagency coordination in the determination that certain actions have no significant environmental impact, and a lack of dissemination of this determination to other agencies and the general public.

## *Recommendations* —*Continued*

to weigh environmental, economic and social costs and benefits?
c. Are the impact statements requiring unnecessary or duplicate information?
d. Are the impact statements fulfilling the need of interagency communication?

5. Agencies should review their policies on a regular basis to determine which areas are important to study, develop and prescribe appropriate alternatives to usual courses of action and to determine what areas are priority areas to initiate further ecological information.

6. When environmental impact statements are required on projects which affect more than one agency, the expertise of each agency should be utilized to develop the impact statement.

7. Each agency should establish its concerns in an ordered priority list. This will insure the maximum effectiveness of the review efforts.

8. To insure the maximum benefits, environmental impact statements should be prepared on broad projects or policies such as an air quality implementation plan, the state highway plan and long range electric utilities' plans. This will insure maximum effectiveness of the environmental funding and regulatory efforts.

9. Early determination whether the term "agency" as it is used in the Wisconsin Environmental Policy Act includes units of local government.

10. A uniform, interagency review process should be established to assist in the determination of what actions have no significant impact and to provide adequate dissemination of this information to other agencies and the general public.

# THE WATER RESOURCE

*"A thing is right only when it tends to preserve the integrity, stability, and beauty of the community, and the community includes the soil, waters, fauna, and flora, as well as people."*

*Aldo Leopold*

## THE WATER RESOURCE

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# SURFACE WATER QUALITY
## Municipal

### *What Has Been Done*

The 1876 Act that created the State Board of Health gave it authority to advise governmental officials in regard to the drainage and disposal of excreta of any public building or institution. In 1905 the Legislature established a law requiring the submission by localities of sewerage plans for review and approval. What may be considered a major advance concerning water resources was the enactment of Chapter 144 of the Statutes in 1919 providing for state level supervision and control of sewage as well as other sanitation controls. Subsequently Chapter 144 was further strengthened when in 1927 the Legislature created the Committee on Water Pollution.

The first comprehensive survey of sewerage systems in the state was made in 1924. It showed 204 municipalities had a sewerage system, 109 of which were not provided with any form of treatment; the percentage of the state population connected to sewers served by sewage treatment plants was 18 percent. Through the joint efforts of the old State Board of Health and Committee on Water Pollution, the percentage of the state's population connected to sewers served by sewage treatment plants reached 90% by 1943 and 99% in 1958. All municipalities with public sewer systems now provide treatment.

Chapter 614, Laws of 1965, the Water Resources Act, organized a comprehensive program under a single state agency for the enhancement of the quality management and protection of all waters of the state, ground and surface, public and private. The added emphasis, staff and financial assistance programs have maintained the state's leadership position in its municipal sewage treatment program. Today, approximately 87% of the sewered communities provide better than primary treatment.

The record shows:

Primary treatment only...85
Secondary treatment...550
Trickling filter...210
Activated sludge...228
Parallell T.F. & A.S....27
Lagoons...85

Total–635

### *Problems*

There are approximately 100 communities with a population of some 150-200 people which have no public sewers or treatment facilities at this time. Construction of sewerage systems in these situations is expected within the next five years. Again, in many instances, a financial hardship will be experienced due to lack of tax base and borrowing authority as well as substantial limitations on federal funds to help defray the costs of such projects.

Municipal waste treatment is highly dynamic. A treatment plant has a normal life expectancy of 20 years. The state requires that consulting engineers, in their plant design, plan the structure and equipment to accommodate population and industry growth projected over the next 20 years. Despite this precaution, facilities are frequently in need of modification or enlargement before they become otherwise obsolete.

Studies undertaken by the Department of Natural Resources in June, 1972 indicate that some 375 communities must update their facilities in the next five years. In some cases, this reflects the need to upgrade treatment to meet revised state or federal standards.

Fundamental to the accomplishment of surface water quality is the expertise in daily operation of the sewage treatment plants, the surveillance of the plants and the assurance that operators are knowledgeable. Though Wisconsin has a mandatory certification requirement, it alone does not guarantee optimum care and concern over daily operation.

### *Laws*

The basic Wisconsin law granting state authority to regulate municipal sewerage systems is Chapter 144 of the statutes.

Chapters 59, 60 and 66 allow the creation of the Milwaukee Metropolitan Sewerage District, the creation of town sanitary districts and metropolitan sewerage districts, respectively.

### *Regulations*

All the following refer to the Wisconsin Administrative Code:

Chapters NR 102, 103, and 104–Water Quality Standards

Chapter NR 106–Interstate Joint Resolutions

Chapter NR 108–General Requirements for Waterworks Sewerage, Refuse Disposal

Chapter NR 110–Sewerage

Chapter NR 114–Certification of Operators of Waterworks and Sewage Treatment Plants

Chapter NR 125–Water Pollution Prevention and Abatement Grants

Recommended Standards for Sewage Works–Design standards proposed by the Great Lakes-Upper Mississippi River Board of State Sanitary Engineers. Used to a great extent as design criteria for Wisconsin municipal sewerage works.

### *What Is Being Done*

Adoption of interstate and intrastate water quality standards, together with requirements imposed by state-federal enforcement conferences, has resulted in rapid upgrading of treatment requirements for municipal wastes.

As a general statement, municipalities in Wisconsin are required to:

1. Provide both primary and secondary treatment for all wastes tributary to their systems.
2. Provide for year-round disinfection of the final effluent.
3. Provide for removal of excess phosphorus where discharges are

causing, or may cause, overfertilization of surface waters.

In addition to these general requirements, the Natural Resources Board has adopted four policy statements relating directly to the construction and operation of municipal sewage treatment plants.

The "Policy on Phosphorus Removal from Effluent" authorizes the imposition of phosphorus removal requirements at any treatment plant where the discharge of phosphorus is causing, or may cause, overfertilization of surface waters.

A "Policy on Proliferation of Waste Treatment Plants" encourages the promotion of unified sewage collection systems serving contiguous areas; connection of developing areas to existing treatment plants when feasible and in the public interest; abandonment of multiple plants in favor of joint treatment where feasible and desirable, and extension of sewers to areas where septic tank-soil absorption systems have failed or where the risk of malfunction or failure is high.

Disposal of effluent is covered in the "Policy on Wastewater Treatment Plant Outfalls." This policy requires that a satisfactory method for conveying the treated effluent to a surface water with adequate assimilative capacity, or for on-site soil absorption, be provided before construction plans will receive state approval.

A "Sewer Extension Policy" recognizes that bypassing of raw or partially treated sewage presents a potential public health hazard, a threat to fish and other aquatic life, and interferes with recreation and other legitimate water uses. This policy states that requests for approval of sewer extensions be denied if the existing sewer system is inadequate to handle the additional flows or the existing treatment facility is volumetrically or organically overloaded.

The state grant-in-aid program initiated in the Water Resources Act of 1965 has been greatly enhanced through enactment of the ORAP-200 program by the 1969 Legislature (Chapter 353, Laws of 1969).

Grants of 25% of construction costs are now available to municipalities on a direct payment basis, as opposed to the 5 to 30-year contracts required by previous law. These funds, obtained through state bonding, can also be used in a broader support pattern than previously. As a result of federal legislation passed on October 18, 1972, the combination of state and federal grants now totals 100%. In view of this, the Department of Natural Resources is contemplating reduction in the state share. In addition to financing treatment plants and intercepting sewers, state aid is available for separation of combined storm-sanitary sewers; for sewer systems installed to eliminate existing sources of pollution from private disposal units, and to assist in financing permanent treatment facilities installed as part of a federal demonstration project.

At the federal level, several agencies are involved in financial assistance for pollution abatement by municipalities. The Environmental Protection Agency provides direct grants of 75% of eligible costs for the construction of waste treatment facilities. The Farmers Home Administration administers both loan and grant programs to assist rural communities in the installation of public water supply systems, public sewer systems and (to a limited extent) waste treatment facilities. Communities in an economically distressed county may receive loans and grants from the Economic Development Administration. Metropolitan areas can benefit from Housing and Urban Development grants for sewer construction. Other supplemental funds are available through certain regional agencies. However, limited increases (or in some cases cutbacks) in federal appropriations; new EPA formula sharing provisions; and executive holdbacks of appropriated funds will likely all contribute to a slowdown in Wisconsin's pollution abatement efforts.

Chapters NR 108 and NR 110 of the Wisconsin Administrative Code are presently under consideration for revision. An Advisory Committee has been established to assist in the revision of NR 110.

The United States Environmental Protection Agency has required that treatment systems conform to adopted water quality management planning in order to be eligible for EPA grant-in-aid assistance. This planning requirement assures that regionalization is instituted wherever feasible.

Operator instructors have been hired for 4 of the 6 Natural Resources District offices to assist treatment plant operators with on-the-job training. Two additional positions are expected to be filled early in calendar 1973.

## *What Is Not Being Done That Should Be Done*

Regional treatment systems–Planning for collection and treatment of municipal waste flows has traditionally been limited to the interest of single municipalities. While some regional planning commissions have attempted to break out of this pattern, there is no consistent effort or activity throughout the state. Adherence to existing political boundaries for planning purposes is frequently not conducive to economy of operation or efficiency of treatment.

Proliferation of plants–While this parallels the first point raised in this discussion, it brings into sharper focus an immediate problem. Through authority granted in Chapter 144, the Department of Natural Resources can and does issue "connection orders" requiring central cities with existing treatment facilities to accept and treat the waste generated in adjacent urbanized areas. This solution is not acceptable to central cities.

Sewer separation and maintenance–Despite the fine record for con-

# Industrial

struction of modern waste treatment facilities which state municipalities have established, these facilities are frequently overloaded due to (a) old systems of combined storm and sanitary sewers, (b) faulty sewers which permit the intrusion of ground water into the sanitary sewer mains, and (c) connection of roof and floor drains to the sanitary sewers. Major attention must be given to this problem, especially in metropolitan areas such as Milwaukee County.

## *Recommendations*

1. Annexation impasse—To avoid the proliferation of inefficient treatment facilities, equitable procedures which will encourage municipalities to extend their sewers to the urbanized fringe are vital.

2. Short courses—Though there is a program for persons seeking certification, there remains the need for advance-type seminars, conferences or short courses for operators already certified. The Department of Natural Resources recently received a one-time federal grant to conduct advanced short courses for certified operators. The University of Wisconsin Extension conducted the courses under a contract with the Department of Natural Resources. Budgetary authority to continue this highly successful program is needed.

3. Research—Studies are needed to determine whether or not mercury, lead, zinc, cadmium, nickel, antimony, chromium, strontium, cobalt, selenium and possible other elements or compounds can be magnified or multiplied through the food chain and by this mechanism, built up within the aquatic environment to levels that might affect any living creatures. Studies are also needed to determine what levels of these known toxic materials in bottom sediments constitute a threat to the aquatic environment.

4. Policy Statements—Policy statements of the Natural Resources Board such as referred to in this section should be adopted as rules pursuant to the procedures established in Chapter 227, Wisconsin Statutes.

## *What Has Been Done*

Cooperative state-industry programs for study of methods of controlling discharges of industrial wastes were initiated by the Wisconsin Committee on Water Pollution in 1927.

The pulp and paper industry established the Advisory Committee on Waste Disposal and with the committee arranged for annual mill waste studies at each pulp and paper mill in the state. As a result of these studies and adoption of recommendations, fiber losses from Wisconsin mills were reduced to one-third of what they would have been had there been no such program. In 1939, the state recommended the establishment of a research organization to study methods of treatment and utilization of spent sulphite liquor from pulp mills. The Sulphite Pulp Manufacturers' Research League, latter known as the Pulp Manufacturers' Research League, was on January 1, 1970 merged with the activities of the Institute of Paper Chemistry and is now the Division of Industrial and Environmental Systems of the Institute, financed by assessments on the industry member mills. Research has resulted in development of several processes for disposal and utilization of spent sulphite liquor. Adoption of these methods by pulp mills resulted in substantial reduction of the organic pollution from the mills.

The cooperative program with the canning industry, financed in part by the industry with the state and National Canners Association providing personnel over the years, involved studying several methods of treatment and disposal of cannery wastes. The development of methods for the disposal of wastes on land by means of lagooning and irrigation to eliminate discharge to streams proved to be an effective means of waste disposal for this industry. However, additional study is needed to determine the effects of such disposal on ground water.

The dairy industry problem was approached through state studies at milk plants where problems occurred. Initially developed treatment methods included the trickling filter which was suitable for the larger plants. Small plants still presented a problem, but with the perfection of irrigation methods for year-round use, the application of this land disposal method for dairy wastes proved feasible and was applied by many plants in the industry.

Additional state-industry studies at malting plants, breweries, woolen mills and metal processing plants led to development of practical treatment and disposal processes which are in use today.

During the past five years, pollution abatement orders have been issued to 375 industries. Of that number, 173 have complied with requirements, 172 orders are still outstanding, and 30 industries have ceased operations. When pollution abatement orders have been referred to the Attorney General, it has been the practice of the Department of Justice to seek court-enforced compliance schedules rather than penalties. The fines and forfeitures levied by the courts against industrial polluters have totalled approximately $15,000.

## *Problems*

With the development of a multiplicity of new processes and plants, there is presently a lack of information about all of the raw materials used by industry and the precise characteristics of industrial waste discharges.

Routine reports on operation of industrial waste treatment facilities are not required. Discharges of industrial wastes which contribute 80 percent of organic load to streams are monitored at infrequent intervals.

## *Laws*

The provisions of Chapter 144, Wisconsin Statutes, apply to discharges of industrial wastes as well as other pollutional discharges. More specifically, Section 144.555 requires a report of intended new waste and is an effective measure for prevention of pollution. Chapter 125, Laws of 1971 in Section 470, creates Section 144.30 (10) defining toxic and hazardous substances. Section 471 creates 144.54, *Reports on Substances Used; Monitoring Fee,* which provides for reporting of quantity and concentration of substances discharged and requires the Department of Natural Resources to, by rule, establish a monitoring fee in addition to an administrative fee provided for by law. Wisconsin Tax Laws, Section 70.11 (21) provides for exemption of pollution abatement facilities from local taxes, and Sections 71.04 (2) (b) and 71.05 (1) (b) provide for rapid write off of investments in industrial pollution abatement facilities. The Federal Tax Reform Act of 1969 in Section 704 of Public Law 91-172 provides for amortization of industrial pollution control facilities in 60 months. Chapter 272, Laws of 1971, created Sections 144.421, 144.422 and 144.423 of the statutes to regulate the discharge of mercury compounds or metallic mercury.

## *Regulations*

Chapters NR 102, 103, and 104, Wisconsin Administrative Code, establish water quality standards for interstate and intrastate waters and can be applied in establishing industrial effluent standards.

## *Recommendations*

1. Reports from industries should be used to develop a complete inventory file to provide at a glance a given industry's raw material uses, production data and waste handling and treatment status. The inventory could also include information on tax exemption status of pollution abatement equipment, results of state surveys, abatement requirements, and costs of pollution abatement facilities.

2. Where physically and economically practicable, joint treatment of municipal and industrial wastes should be encouraged. This is particularly important in areas where provision of regional treatment systems is essential to the abatement of pollution.

3. The Wisconsin Tax Laws requiring certification of pollution abatement facilities for exemption from local taxes should be amended to provide for certification in the first year for which exemption is claimed as applicable for all subsequent years for the same equipment to eliminate repetitive processing and reduce administrative costs. The law should specify "treatment facilities" as the only "pollution abatement facilities" eligible for exemption. The law should also specify whether or not industrial waste systems discharging to a municipal sewerage system and treatment plant can be considered as eligible for exemption.

4. The Department should seek funding for and provide an adequate staff to issue municipal and industrial discharge permits under the provisions of the 1972 Amendments of the Federal Water Pollution Control Act.

# Agricultural

## *What Is Being Done*

The staff of the Department of Natural Resources' Industrial Wastewater Section in the Bureau of Water Supply and Pollution Control of the Division of Environmental Protection has been expanded, and industrial waste control programs are being implemented.

Public hearings have been held on proposed animal waste rules.

The Bureau of Standards and Surveys has completed a series of public hearings on proposed rules governing industrial waste discharge reporting and establishing monitoring fees. In addition, this Bureau is processing industrial reports of discharges for certification for permits under the Federal Water Pollution Control Act.

## *What Is Not Being Done That Should Be Done*

Detailed monthly reports should be required from every industry operating waste treatment facilities (Section 144.09, Wisconsin Statutes).

Consideration should be given to requiring industry to routinely report on the characteristics of untreated discharges (Section 144.55, Wisconsin Statutes).

## *What Has Been Done*

(See also Land Chapter, Solid Waste Disposal, Agricultural)

Farming has brought about a pronounced change in both hydrologic characteristics and surface water quality over conditions which existed prior to settlement. Cropland now occupies 11,546,178 acres (1969 U.S. farm census) or about 30% of the land area of the state; land which once was forest or prairie.

Conversion of native vegetation to cropland generally results in a greater proportion of surface runoff, increased soil loss, greater fluctuation in stream flow, and warmer summer water temperature.

In addition, farming causes an increased pollutional loading on the surface waters. The pollutants from farming operations are generally categorized as: 1. Sediments from soil erosion; 2. Plant nutrients; 3. Oxygen demanding organic materials; 4. Microorganisms; and 5. Pesticides.

It appears at this time that some aspects of farm pollution are being remedied and other aspects are likely to become worse. Soil erosion has generally been reduced from the rates which occurred during the early 1900's. Better understanding of pesticide behavior in the environment and restrictions on the use of certain pesticides will likely result in a reduction in amounts reaching surface waters.

Watershed protection under the approach utilizing PL-566 considers a land treatment project for all lands in the watershed as an essential element for proper use and protection of the water and related land resources. Structural works of improvement having substantial group benefits have been installed for the purpose of reducing flood damages, controlling erosion and providing agricultural water management. In eleven PL-566 watershed projects completed to date, it has been determined that 70-75% of the land has been adequately treated.

In an effort to control the pollution problems that can result from improper animal waste management, the Department of Natural Resources proposed animal waste management rules in early 1972. The proposed rules were prepared by the Department in cooperation with an advisory committee whose membership included farmers, agri-businessmen, University of Wisconsin scientists and engineers, plus representatives of the USDA-Soil Conservation Service, USDA-Agricultural Stabilization and Conservation Service, Wisconsin Department of Agriculture and Wisconsin Department of Health and Social Services. The purpose of the proposed rules was to provide livestock producers, agri-businessmen and public entities a basis for making sound management decisions which are compatible with water resources statutes. The proposed rules were primarily concerned with controlling surface and groundwater pollution problems associated with manure storage systems, feedlot runoff, streams flowing through barnyards, and winter manure spreading near streams. After a series of educational meetings, six public hearings were held at various locations throughout the state in March, 1972. A large number of farmers appeared at the hearings and were generally in opposition to the proposed rules. Since the public hearings a transcript and a summary of the hearings has been prepared. The advisory committee has met several times and have recommended certain revisions to the original proposals.

## *Problems*

Much publicity has been given to agricultural pollution in the past few years. There is very little well documented information on the magnitude of this pollution problem. Much of the information is based more on conjecture than on research and monitoring.

The magnitude of this problem is

related primarily to the large number of farms and large areas of land involved rather than to the intensity of pollution at any given point. There are presently 98,973 farms in Wisconsin and 18,109,273 (1969 U.S. farm census) acres of land in farm ownership. Of this number 50,818 land-owners and 9,884,250 acres of land (approximately 30% of the total land area of the state) are involved in the soil and water conservation district land use and water management program. Any attempt to deal with farm pollution requires a very broad scale, long-range program.

If present trends continue, it is likely that some other types of pollution problems will increase. There will likely be a trend to larger concentrations of livestock in commercial type operations. This will present waste disposal problems which will affect both air and water. There will probably be a trend toward higher percentages of cultivated row crops and cash crop farming which will cause localized increases in erosion rates. As the public demands higher water quality and pressures for water oriented recreation increase, it is likely that conditions which have been tolerated in the past will no longer be acceptable to the general public.

Many of the problems quoted in the first edition of QUALITY MANAGEMENT FOR WISCONSIN have been reflected in recent research and in the Department of Natural Resources proposed rules. If the recommendations for manure management in the proposed rules were implemented it is felt that those problems would be reduced significantly if not eliminated except for No. 5, "How can odor and fly problems be overcome?" This area requires further study before any regulations can be adopted.

There is a real conflict between the public and government. The farmer in testimony against the rules states that:

1. Rules should come from a local level of government—not the state. This obviously would lead to confusion throughout the state and local levels of control would not meet the objectives of state water quality laws and programs as established under section 144.025 Statutes.

2. There is a lack of technical assistance available to the farmer when confronted with water pollution abatement requirements.

3. There is lack of sufficient government aid when farmers attempt to abate water pollution.

The ecologists and environmentalists appear to show only a token interest in the development of regulations for animal wastes to date. If that segment of the public has significant concerns in this area they certainly did not show it during the six public hearings held throughout the state on the proposed rules.

The legislature passed bill 1545 A. requiring the Department to first obtain legislative review and approval of any proposed rules on agricultural wastes before they can become law. In view of the need for the farmer to receive assurance that he can meet the water resources laws when developing and expanding his production unit, rules on animal waste management should be given high priority by the legislature.

## *Laws & Regulations*

State and local involvement in farm pollution has traditionally been strongest in the area of regulation. Local control can take place through land use zoning, sanitary ordinances, and the public nuisance laws. State regulation of water pollution from farm sources can take place under the authority of Chapter 144 or 29. Chapter 92 covers the basic authority of the state in soil and water conservation. Sediment control legislation can be developed in each county through Chapter 92.

The federal government has traditionally provided leadership in soil erosion control through the U.S. Department of Agriculture. This assistance has taken the form of cost sharing through the Agricultural Conservation Program and technical assistance through the Soil Conservation Service and U.S. Forest Service. Public Law-566 provides for assistance to farmers on a watershed basis and the Resource Conservation and Development Program provides for special assistance to economically depressed areas.

## *What Is Being Done*

Reduction in farm pollution can be brought about through six general mechanisms: 1. Education and technical assistance; 2. Improved technology; 3. Easements; 4. Tax considerations; 5. Cost sharing; and 6. Regulation. The U.S. Soil Conservation Service and the Cooperative Extension Service both have active programs in education and technical assistance. Both of these agencies are concerned about water quality and have already incorporated much rural pollution abatement into their programs. Any type of program to abate rural pollution will need to have a strong informational and educational basis and it would seem that these agencies are the logical ones to perform this function. There is a limit to what can be accomplished through education, since many of the costs of pollution are off-site or external costs which do not affect the farmer. Since considerable expense may be involved in the future to abate certain types of pollution and there will be little economic benefit to the farmer, it will very likely require regulation or cost sharing to implement some practices.

Improved technology is a very important aspect of farm pollution control. Much progress has already been made in this area. For example, minimum tillage of crops reduces soil erosion and it is a practice which appeals to farmers because it also reduces production costs. Liquid manure handling

can reduce nutrient runoff, but it is mainly of value to the farmer if it reduces his labor and operating costs. There is research underway to develop new techniques which will reduce water pollution and at the same time be profitable to the farmer. This research probably should be accelerated. Also, the Departmen of Natural Resources has asked the Governor's Task Force on Land Use to give consideration to the concerns of research and development of techniques for handling odor problems.

Cost sharing is an effective method of stimulating the adoption of a practice which is marginal or unprofitable. It has been used by the Agricultural Stabilization and Conservation Service for many years for soil and water conservation and related practices. This program has recently been expanded to include practices which relate specifically to water pollution. However, the entire ACP program may be altered and shifted so that more permanent type of land treatment practices will be installed plus more of the populace will be eligible for cost sharing.

## *What Is Not Being Done That Should Be Done*

Section 92.09 of the state statutes provides for the adoption of land use regulations for the express purpose of conserving soil and water resources and controlling erosion. To date, no ordinances have been adopted under this provision. Model ordinances are being drafted which county soil and water conservation districts can adopt.

Statewide rules proposed for the Management of Animal Wastes should be adopted under the Wisconsin Administrative Code and the statutory authority of sections 144.025 and 144.555, Statutes.

Adequate state and federal financial aid should be made available for those serious farm pollution sources which may be cited in water pollution abatement activities by both state and/or federal regulatory agencies. Such aids should adhere to the same philosophical patterns as the financial aids to other private industrial enterprise and municipalities.

Adequate technical assistance should be expanded and made available to the farmer in solving animal waste problems on the farm.

Section 70.11 of the Wisconsin Statutes on tax exemptions should be revised to include exemptions for farmers who construct *approved* facilities directed specifically toward the abatement of air and water pollution on the farm.

## *Recommendations*

1. County Soil and Water Conservation Districts need assistance in preparing and adopting sediment control ordinances.
2. A study be conducted to establish criteria for differentiating farm operation vs. a farm industry.
3. Statewide rules be adopted for the management of animal wastes.
4. State and federal financial aid be made available to the farm industry in a manner similar to the financial assistance offered the private industrial enterprises and municipalities.
5. Technical assistance be expanded for solving waste problems on the farm.
6. Section 70.11, Wis. Stats., be amended to include exemptions for farmers who construct approved water and air pollution abatement facilities on the farm.

# Recreational

## *What Has Been Done*

The people-surface water ratio continues to grow more desparate. Meanwhile, an intensification of use has taken place. It is inevitable, therefore, that overuse and growing conflicts are experienced. With four and one-half million people plus millions of out-of-state visitors, 50% of whom are interested in making use of the surface waters for one form of recreation or another using the 1.1 million acres of water in the inland lakes and streams, guidance of and provision for recreational activity and protection of quality will be necessary. While demands for recreational use increase the surface water use for waste disposal also intensifies.

At the state level there are now programs for land acquisition and development for parks, access, fishing areas, wetlands and pollution control authorized by law and budget. A strong survey and enforcement program has made substantial progress in reducing pollution. Very general state laws govern boating. Sections of the statutes provide for more strict local regulation plus state safety education and enforcement activity and there are aid programs for water safety patrols, navigation aids, development of recreation areas, and access points. Federal aids are also available under the Dingle-Johnson Law, Pittman-Robertson Law, Land and Water Conservation Fund, Housing and Urban Development Funds, and Small Watersheds Act for land acquisition and development. A demonstration grant from the Upper Great Lakes Regional Development Commission has contributed to knowledge of potential lake improvement measures.

The Department of Natural Resources can point to very substantial additions and improvements to public recreation lands, acquisition of which was accelerated by ORAP laws (Outdoor Recreation Act Program). Since initiation of this program in 1961, 300,000 acres have been acquired. Development of a number of new parks and recreation areas since 1961 contributes to accommodation of the great increases in the amount of fishing, hunting, swimming and boating. At the same time, there have been additions made to federal holdings for national forests, wild and scenic rivers and national wildlife refuges.

Other new federal developments have been the establishment of the Apostle Island National Sea Shore on Lake Superior and the Ice Age Park describing our glacial past.

Forces developing, maintaining and policing lands and outdoor recreation activities have not expanded proportionately. These shortcomings begin to show in terms of low levels of maintenance, property damage and accidents. In the face of this growth in numbers of people and lands and waters served, there has been little additional growth in some services and management activities.

The fisheries of the state are supported by a management staff which provides regulatory services, inventory, habitat protection and development, species manipulating and stocking services. A notable accomplishment has been completion of a waters inventory for each of the 72 counties.

Inland fisheries have remained reasonably steady except for continuing increases in the numbers of fishermen. In the period since 1940 Great Lakes fisheries for lake trout virtually collapsed from the lamprey predation and invation of low value alewife resulting in a substitution for such preferred species as herring (cisco), chubs and perch. But now lamprey have been brought under control and production of preferred species has been substantially improved. A thriving sport fishery now exists on Lake Michigan for lake trout, coho salmon and chinook salmon, and an improving lake trout fishery exists on Lake Superior. These new fisheries are tightly regulated to assure their continued production and stocking services are essential. Production of an additional 200,000 pounds is needed to maintain Great Lakes stocking at desired levels. Maintaining an adequate fishery management program is dependent upon license incomes.

Optimum utilization of the surface waters sometimes requires management measures which can range from rough fish control with toxicants to chemical control of aquatic plants or water level manipulation. All these programs are operational under a permit system.

An expanded wild and scenic rivers program with both state and federal inputs is the newest program of the last decade. The federal recognition of the St. Croix and Namekagon and Wolf Rivers in Menomonie County as national scenic waterways and initiation of a land acquisition program on the Namekagon-St. Croix has prospects of preserving the quality and assuring use of these waterways. The state has acquisition programs on the Wolf in Langlade County, the Pine-Popple in Florence County, and the Pike in Marinette County. State acquisition of lands continues on other waterways, such as the Flambeau and Brule, which have been designated as wild rivers by the DNR Board. Lacking in dealing with wild and scenic rivers to date has been adequate land zoning and water zoning powers. These circumstances have resulted in concentration on public land acquisition.

In 1931, the then existing State Board of Health established regulations relating to natural bathing places. Since that year, natural bathing beaches have been investigated upon request for such services. In addition, plans of bathhouses and other sanitary facilities proposed for installation have been required for review and approval prior to construction. Also, special survey evaluations of bathing beaches supported by the Land and Water Conservation Fund have been conducted since 1967.

The most recent increases in surface water area have come from flood control of impoundments built by either the Soil Conservation Service with state and local inputs, or the Corps of Engineers. Some recreational impoundments have been provided by the private sector also. The Corps of Engineers has constructed one flood control impoundment (Spring Valley) and has another underway (La Farge). Three units have been developed in the private sector and nearly all lands around them sold to home builders. All such water created by the impoundments become public waters and access points to the waters are required.

Under the small watershed law, (PL-566), five soil and water conservation districts have installed seven multiple-purpose sites. The multiple-use projects provide flood control and recreation.

The utilization of local financial assistance administered through Soil and Water Conservation Districts, state aid administered through the Soil Conservation Board, and federal assistance administered through the Soil Conservation Service, resulted in a land acquisition program by six Soil and Water Conservation Districts totaling 6,223 acres and involved 787 surface acres of water, of which 147.0 surface acres lie within the confines of one state park. In addition, three projects have been approved but are awaiting financial assistance. Continued progress in the small watersheds can be expected.

## *Problems*

Despite a degree of success with meeting problems, there are growing problems related to quantity, quality and availability of the water resources and to existing funding. The assumption made is that beneficiaries should be in a position to pay at least a share of the costs and historically for some programs, they have carried all the costs.

Growing problems exist in wide diversity of boating regulations, the adequacy of access and the quality of surface waters. With each local community providing its own set of regulations, we face a growing diversity of local regulations and relatively inadequate enforcement. Many waters have now an inadequate access with resultant excessive concentrations at other sites. Excessive fees are charged in certain localities intent upon keeping people out. At the same time, declining quality may be evident in the form of eroding banks, silty waters, excessive plant growths and littering. There is also suspicion that motorboat exhausts with leads, phenols and carbon gases may be more harmful than at first realized. Public support of lake improvement programs to avoid winterkill of fish, excessive aquatic plant problems, and to provide acquisition, development and maintenance of access sites would seem justified on the strength of numbers of participants and funds contributed.

Fishermen have always paid for their sport in the form of license fees. However, the last license increase was 1962, and since that date costs have continued to escalate. If present services are to be maintained, a significant increase in fees will be necessary ($2 increase).

In contrast with fishing, boaters (or fishermen using motorboats) and water skiers make little contribution to either the facilities for their sport or policing activities. Instead, except for $100,000 devoted to access over public lands, gas tax monies paid by boaters is contributed to the highway fund. None is paid into boat regulation; there are no contributions to lake improvement, or access development and maintenance.

It should be pointed out that boaters of one kind or another pay into the state treasury about $2,900,000 annually (2 percent of the total gas tax income), yet little of these funds gets funneled back into those functions which directly benefit boating or water activities. In view of the deficiencies noted, it is well to consider funneling these motor fuel funds toward those who would be expected to benefit.

State health staff is insufficient to conduct routine sanitary investigations of public bathing places. It is necessary that local government perform such service for the approximate 9,000 public beaches in the state. Unfortunately, few local governments are equipped to do so, resulting in numerous public beach operations without benefit of sanitary surveillance.

## *Laws*

A list of the state laws governing the various activities is as follows:

Boating–Chapter 30 sets forth regulations on licensing, boating rules and prescribes sanitary facilities.

Management of water resources–Chapter 23 defines the role of the Department of Natural Resources in acquiring lands and managing fish and game.

Public Access–(1) Access Aid-Section 23.09(15a); (2) Access Road Fund-Section 20.395(v)(h); Plat Access-Section 236.16(3).

Beaches–Section 140.05(3) provides for regulation of beaches.

Pollution–Chapter 144 provides pollution control laws.

## *Regulations*

The Administrative Code (NR 45.09) regulates boating on waters surrounded by state lands. Most of the regulatory measures provided are for lakes within state parks and wildlife areas. The Code also provides for a standardized buoy system, and boat capacity regulations (Chapter NR 5). A section of the Health Code (H 70 and H 71) governs boat toilet wastes and public swimming, respectively.

## *What Is Being Done*

Boating law enforcement now consists of wardens enforcing the very general state law and local boat patrols enforcing local laws. There are now 87

local water safety patrols. State aids help to support this activity. Local demands exceed available funds. Local units of government have authority to enact regulations more strict than state law, but in doing so, contribute to nonuniformity.

The only lake improvement or creative programs other than regulatory, are the impoundment construction associated with Public Law 566. Any lake improvement programs which are presently being provided are now locally financed. The state has trust responsibility for lakes but yet has not been active on improving lakes in such ways as stabilized water levels to avoid winterkill, or dredging to provide more usable water. At present the Department of Natural Resources has a spring pond improvement program employed on spring ponds surrounded by state land. Beach surveillance is hampered by an inadequate staff. Lake improvement potential has been enhanced by the investment of federal funds in demonstration lake improvement grant.

As for access to waters, all the various units of government normally provide boat access where they own lands on the shores of waters. Included is the United States Forest Service and Fish and Wildlife Service in places like the Upper Mississippi River Refuge and Nicolet or Chequamegon National Forest and the U.S. Corps of Engineers. The dominant providers of access are the towns and cities because they inherit the road net in the process of platting. These are commonly inadequate because of size or location. There is a growing disparity between the amount of available access and the amount required. At the same time, with increases in use, there is need to control the amount of use. Limitation of public access provides that kind of control.

## *What Is Not Being Done That Should Be Done*

The overall picture is that of an immense increase in the use of surface waters which has run way ahead of the establishment of suitable management measures and regulations. Private developments and growth of incompatible activities has few or inadequate controls in most instances. Land zoning helps but is inadequate in itself.

With the shrinking water resource base relative to population and intensification of use, one would logically expect that there should be a strong lake and stream improvement program consistent with trust doctrine. But there is not, despite evident deterioration as seen in turbidity, weeds and algae and fish kills. The state provides virtually no improvement services except for stream improvement on trout streams and some fish shelters on lakes. Some artificial lakes have been built by the state (Yellowstone, Cox Hollow, Twin Valley, etc.) over the years, and under the PL-566 (7 projects), but there has been virtually no improvement of existing waters unless done locally on a small scale.

Also, one would expect a fully adequate access program ultimately designed to provide adequate and appropriate access to all waters, and a boat safety law enforcement program that was proportional to the amount of use. But deficiencies cited previously are prevalent and they can only be corrected by a better level of funding. Achieving uniformity in regulations requires that state review of local regulations be provided.

As for beaches, the state health agency should establish an advisory ad hoc committee to develop more comprehensive regulations relating to beach operation and maintenance. The state health agency should be authorized at least one full-time staff position to concentrate in a natural bathing beach program.

## *Recommendations*

1. Amend the gas tax law to appropriate the portion that comes from sales to boaters to water recreation improvements and improved boating laws. The present need is to provide additional funding and aids for water safety and enforcement, public access, and lake and stream improvement.

2. The state regulations relating to natural bathing beaches be expanded in the area of operation and maintenance.

3. Full-time staff be established in the health agency to provide a more active program in natural bathing beach sanitation.

4. The boating law should be strengthened to infuse elements of uniformity and provide for state review and approval of local regulations.

5. Machinery is needed to control numbers of users in many aquatic recreational circumstances.

6. A higher level of funding (license fee increases) is needed to adequately support fishery and wildlife management services at present levels.

# Wild and Scenic Rivers and Lakes

## *What Has Been Done*

This program of preserving wild and scenic rivers in Wisconsin started over a half century ago when a state forest was created along the Brule River in Douglas County. Later, a forest also was established along a portion of the Flambeau River in northwestern Wisconsin. Many actions have been taken to prevent the Wolf River in northeastern Wisconsin from being dammed to create flowages. Recently some 40 miles of this river shore in Langlade County have been secured by DNR and easements have protected the Menominee County shoreline from being developed by buildings, pending funds and action planned under the federal wild and scenic rivers program. The federal action program more advanced on the St. Croix-Namekagon Rivers, where with a gift from the Northern States Power Company, some 70 miles of the St. Croix is assured of protection through coordinated planning and management which includes establishment of a new state forest under DNR. Chapter 363, Laws of 1965, established a system of wild rivers in Wisconsin in order to preserve them "in a free-flowing condition and to protect them from development". The three rivers named at that time, Pike (Marinette County), Pine and Popple (Florence and Forest Counties) were "to receive special management to assure their preservation, protection and enhancement of their natural beauty, unique recreational and other inherent values", and other rivers could be added to the system by the Legislature. The Wolf, although not named in the wild rivers law, has been the subject of special legislation which prohibited dams and navigation improvements in Shawano, Menominee and Langlade Counties. The Conservation Commission several years ago adopted a written policy statement on this subject and recently the Natural Resources Board established the Brule, Flambeau and St. Croix Rivers where they flow through state forests as "wild rivers".

As for wild lakes, there are extensive public lands in state and national forests and even in county forests, but few lakes have been designated as wild lakes not subject to the encroachment of improvements. Each national forest and state forest with large numbers of lakes has delineated some lakes as "wild lakes", but these are mostly small basins. An example is Pallette Lake, Vilas County. Some types of aquatic habitat are tender and require protecting. Extension of natural areas to these situations is desirable. Everywhere there is the pressure for development into housing sites.

## *Problems*

Certain sections of some of Wisconsin's wildest and most scenic rivers are very desirable for development of homesites or private camps and potential damage to their scenic beauty and wild characteristics is obvious. An example of such development is the Namekagon River near Hayward. In a development near Cable actual platting was taking place inside the land corridor of the Namekagon wild river. The threat of private development for needed tax income funds is ever present in an area such as Menominee County. The ORAP-200 program set aside specifically $50,000 per year for acquisition of lands on wild rivers, and other funds are designated for state forest use. These funds are competing with the private sector for the same lands. The improvements associated with development, such as power lines and gas lines, commonly slice across wild lands. Most recently the threat of mining developments has emerged. Better controls are needed over utility and highway crossings and mining developments over and on wild rivers. Here and elsewhere there may be a need for establishing priorities of land use that would necessarily have to be flexible with time according to societies needs. For example, mineral deposits as well as wild rivers occur where they are and not where we want them. Both are rare commodities. If a strategic mineral deposit is located in a wild river area, a priority judgement would have to be made as to which interest is to the greater public benefit. If, in time, the mineral deposit does become of more importance than the wild river, mining should be allowed with due concern for environmental damage. It is important that the need for such priority judgements be recognized in developing land use controls.

## *Laws*

1. Section 30.26, Wis. Stats.–System of Wild Rivers
2. Section 30.251 (Laws of 1969), Wis. Stats.–Wolf River Preservation Easements
3. Section 30.25, Wis. Stats.–Wolf River Protection
4. Federal Wild and Scenic Rivers Act–PL 90-542-naming parts of three Wisconsin rivers for action programs and making appropriations (Upper St. Croix, Namekagon and Wolf in Menominee County). An amendment passed in 1972, (PL 92-560), added the Lower St. Croix.

## *Regulations*

NR 45.12–Wolf River Preservation Area, Menominee County.

## *What Is Being Done*

There is substantial public interest in this subject, especially by the John Muir (Wisconsin) Chapter of the Sierra Club, and the Wisconsin Division of the Izaak Walton League of America. Also, the Wisconsin Academy of Sciences, Arts and Letters is preparing a series of research papers on the Pine-Popple Rivers, while a private donor has contributed $100,000 to DNR for fisheries research on the Pike River. Possibly the most exciting plans are on the St. Croix River with a special citizen-industry committee working cooperatively with local government and the States of Minnesota and Wisconsin, and the Federal government. In DNR, local managers of the state forest and recreation areas are in charge of wild rivers, so far designated by the Natural Resources Board in the northwest, while the Fish

Management Bureau has been given responsibility for the Pike, Pine, Popple and the Upper Wolf Rivers. This latter group acquires land and easements and also manages project lands on some of these rivers. Agreements also have been worked out with some power companies in regard to their management of wild areas on other waterways. The federal government now is buying private lands on the St. Croix and Namekagon Rivers and has had some contact with Menominee County officials on the Wolf River project.

To date, on the Wolf River in Menominee County, there have been negotiations for land by the National Park Service but no action has been forthcoming.

## *What Is Not Being Done That Should Be Done*

The Department of Natural Resources should step up its program of wild and scenic river preservation and protection because of increasing examples of private development and damage. More aggressive and better coordinated action is desirable in acquisition of shoreland control rights, easements and cooperative agreements with the U.S. Forest Service, counties and private forest landowners along these selected reaches of waterway. Full use also needs to be made of existing shoreland and floodplain zoning controls and a citizen agency group to help coordinate and recommend actions should be formed.

There is need to more formally and specifically designate wild lakes. Some have been delineated in past forest management plans but their existence is little known beyond these documents. The zoning tool has not been used to provide extra protection for unique bodies of water, whether lake or stream.

## *Recommendations*

1. Those portions of Wisconsin rivers already defined by federal act or by Natural Resources Board decisions as wild or scenic rivers to be added to the state's "System of Wild Rivers" so that besides the Pine, Pike and Popple, this list would include specific reaches of the Bois Brule, Flambeau, Namekagon, St. Croix and Wolf Rivers.

2. Wisconsin should urge the federal government to proceed as rapidly as possible in cooperative planning, acquisition and management of the Namekagon, St. Croix and Menominee County part of the Wolf River defined in the federal Wild and Scenic River Act. A definite date should be determined, after which the state will no longer purchase easements in Menominee County along the Wolf River.

3. The Natural Resources Board should establish a Wild and Scenic Rivers Advisory Council made up of interested citizens and resource agency personnel to consider problems and make recommendations on management of Wisconsin's system of wild and scenic rivers.

4. Stronger state zoning is needed to preserve wild rivers and designated wild lakes from development.

# Eutrophication

## *What Has Been Done*

Due to public recognition of the high value of the lake resources in the state, significant effort has been directed toward identifying the physical description and condition of these resources. Of particular concern is the influence of eutrophication, which is the process of enrichment of lake water by natural and/or man-induced addition of nutrients. Wisconsin has over 5,000 named inland lakes and an equivalent number of unnamed lakes. Together these lakes cover approximately 940,000 acres of the state. This figure excludes the vast acreages of Lakes Michigan and Superior within Wisconsin boundaries. Figure 1 shows the distribution of the named lakes and total lake acreage according to counties. There are about 115 lakes which have surface areas greater than 1,000 acres and over 1,000 lakes between 100 and 1,000 acres in size.

As a result of the lake classification program established by the State Legislature, a systematic inventory of the state's surface water resources on a county basis was undertaken in 1959. These inventories include information concerning the physical characteristics of lakes, general water quality, available fisheries, number and types of existing shoreline developments, and public access sites, as well as lake use information. Inventories are essentially completed for each of the 72 counties.

Research on lakes started by Birge and Juday in the late nineteenth century has been continued with varying degrees of intensity. A series of coordinated scientific studies was undertaken in the 1940's to identify the causes of the excessive enrichment of lakes in the vicinity of Madison. These studies focused attention on the direct and indirect influx of nutrients to lake systems and the role of these nutrients, principally nitrogen and phosphorus, in the growth of algae and rooted aquatic plants. As a result of these studies, action was taken to restrict the discharge of treated sewage effluent to the lake chain as this

effluent was found to be rich in nutrients.

Starting again in 1965 both federal and state programs stimulated increased support for research and investigations on eutrophication. Chapter 502, Laws of 1965, State of Wisconsin, provided support for research and data collection programs on water resources and significantly strengthened activities concerned with eutrophication. In addition to the program of long-term lake water quality monitoring initiated by the state program, several fundamental studies on the eutrophication process were supported at the University by the U.S. Environmental Protection Agency and the Office of Water Resources Research of the U.S. Department of the Interior, and inland lake demonstration projects were supported by the U.S. Department of Commerce.

## *Problems*

The values associated with lake environments in providing for the essential and aesthetic needs of man have been well recognized for many years. As a result, these values have encouraged investigators to develop an understanding of the ecology of lakes and lake-related environments. Even though some lakes, because of the nature of the watershed and the characteristics of the lake, are naturally eutrophic, most lakes may be disrupted to some degree by cultural changes. The enrichment of a lake is a dynamic process that is often greatly accelerated by man's activities. Thus, the eutrophication process poses a real threat to primary resource bases in many regions of the state.

In regard to the chemicals required for aquatic plant development, studies have shown that carbon, hydrogen and oxygen are readily available in lakes; however, growth may be limited by the lack of nitrogen and phosphorus and, to a lesser degree, by the lack of many different trace elements. The principal sources of nitrogen are municipal and industrial wastewater, urban and rural runoff, precipitation, ground water infiltration, marsh drainage, and nitrogen fixation by lake algae; by comparison, the major phosphorus sources are limited to wastewaters and runoff from urban and rural areas.

Eutrophication has a detrimental effect on domestic, industrial, recreational and agricultural uses. Typical problems are: offensive odors and destruction of scenic beauty caused by excessive growth of algae and aquatic plants; increased difficulty in treating municipal water supplies from lakes; negative changes in the quality of cold water fisheries; and loss of recreational opportunities. For example, in lakes or streams which are undergoing rapid eutrophication, the algae affect water treatment plant operations by rapidly clogging filters and causing undesirable tastes and odors.

Because of the large number of lakes in the state and the complex relationship associated with eutrophication, it is unlikely that a single type of agency control, either at the state or county level, will be effective in the proper management of these lakes and related land resources. In the past, general local governmental and quasi-governmental structures have not been effective in conducting water quality control programs on the smaller lakes in the state as a result of a lack of authority, financial support, or technical advice.

## *Laws*

Wisconsin Chapters 30, 31, 144. General statutes.

29.29(3). Discharge of deleterious substances into any waters.

144.025(2)(b)(1967). Water quality standards for interstate and intrastate waters.

144.26 (1967) and 59.971 (1967). Shoreland zoning.

144.53. Suppression of nuisance-producing growth.

144.05. Pollution of certain lakes–Lake Mendota.

## *Regulations*

Chapters NR 102, 103, and 104 (1968), Wisconsin Administrative Code.

Wisconsin Water Quality Standards and Stream Classifications.

Chapter NR 107. Aquatic nuisance control.

Chapter NR 115. Wisconsin's shoreland management program.

## *What Is Being Done*

In 1965, the Legislature enacted Chapter 614, which authorized counties to adopt shoreland zoning regulations designed to protect amenity of the shoreland and control water quality degradation. To accelerate the implementation of this authority, a model ordinance was developed to assist counties in meeting the requirements. The guidelines provided for three elements: 1) zoning ordinance, 2) subdivision regulations, and 3) sanitary code provisions. All counties have established the necessary regulations and are in compliance with the law.

In 1968, the Inland Lake Renewal and Shoreland Management Demonstration Project was undertaken jointly by the Wisconsin Department of Natural Resources and the University of Wisconsin. This five-year project, which is supported by the Upper Great Lakes Regional Commission, has the primary objective of demonstrating operational and experimental techniques to restore, maintain and protect a high quality environment within, and adjacent to, inland lakes in the region.

The following is a summary of project activities:

Lake Renewal Techniques:

1. Drawdown for the control of rooted vegetation and sediment consolidation.
2. Lake bottom treatments, including sand and gravel blankets and plastic sheeting to inhibit weed growth and nutrient transfer.
3. Pumping techniques to replace nutrient-rich lake water with less fertile ground water and precipitation.

4. Nutrient inactivation (phosphorus removal) with the use of aluminum salts.

5. Aeration of the hypolimnion without disrupting the normal thermal stratification.

Topical Studies Related to Lake Renewal and Protection:

1. Urban runoff as a source of nutrients.

2. Nutrient contribution from septic systems.

3. Review of lake dredging.

4. Review of aquatic weed harvesting.

5. Review of lake renewal efforts and experiences throughout the world.

Shoreland Management Studies:

1. Marketing and recreational demand surveys.

2. Management of lake-oriented recreational complexes.

3. Lake construction, land subdivision and development.

Studies Related to Management and Policy Issues:

1. Role of lakeshore property owners' associations.

2. Methods and regulations pertaining to on-site waste disposal systems.

3. Lake protection and rehabilitation legislation.

4. Educational programming.

5. Chippewa Flowage investigations.

Research programs on eutrophication have been strengthened by federal grants under the Office of Water Resources Research, the Environmental Protection Agency, and the National Science Foundation (Sea Grant, including the Great Lakes). Results of these investigations will lay the foundation for making decisions on alternative control and management actions in the future.

Several pollution abatement action programs are underway. Communities with populations over 2,500 and located in the Lake Michigan watershed are adding phosphorus removal processes to their sewage treatment facilities in compliance with special orders issued by the Department of Natural Resources. Also, a federal cost-sharing program has been approved for farm operations in the Lake Mendota watershed to demonstrate the operational effect of winter storage and spring spreading of manure. This manure control program will reduce the loss of nutrients in the spring runoff that commonly results from the spreading of farm animals' wastes on frozen ground.

## *Recommendations*

1. Despite the fact that research and demonstration programs have received more support in recent years, the magnitude of the problems and the vast opportunities to be realized from such programs strongly justify more long-term support for them.

2. Research and development of low-cost wastewater treatment and on-site disposal systems in problem soils should be continued and expanded. Likewise, emphasis should focus on nutrient control in treatment systems in near-lake environments.

3. Agency staff should be expanded to provide assistance to counties and lake communities in establishing and planning comprehensive lake management programs. This would permit the state to take advantage of the advanced developments that result from the research and development programs.

4. The Natural Resources Council of State Agencies should undertake an in-depth study of needed governmental structures to provide for the effective control of water quality and the management of shorelands of inland lakes.

5. Educational programs and short courses should be expanded to inform elected representatives, citizens and concerned groups of procedures and actions that are useful in developing effective lake management and protection programs. Joint participation by the Departments of Health and Social Services, and Natural Resources, and the University of Wisconsin Extension would enhance this activity.

6. Establish a "wild" lakes program in the state along the lines of the wild river system to provide for the preservation of selected pristine lake environments.

## *What Is Not Being Done That Should Be Done*

1. With few exceptions, local and state activities have not been adequate for protecting inland lakes from noticeable signs of eutrophication. The Wisconsin County Shoreland Corridor Zoning Program is a major step forward; however, it is limited in its effectiveness because of the lack of data on direct and indirect nutrient sources, and the lack of information on the technical alternatives for reducing the nutrient influx to acceptable levels. An intensified water quality monitoring program will be needed.

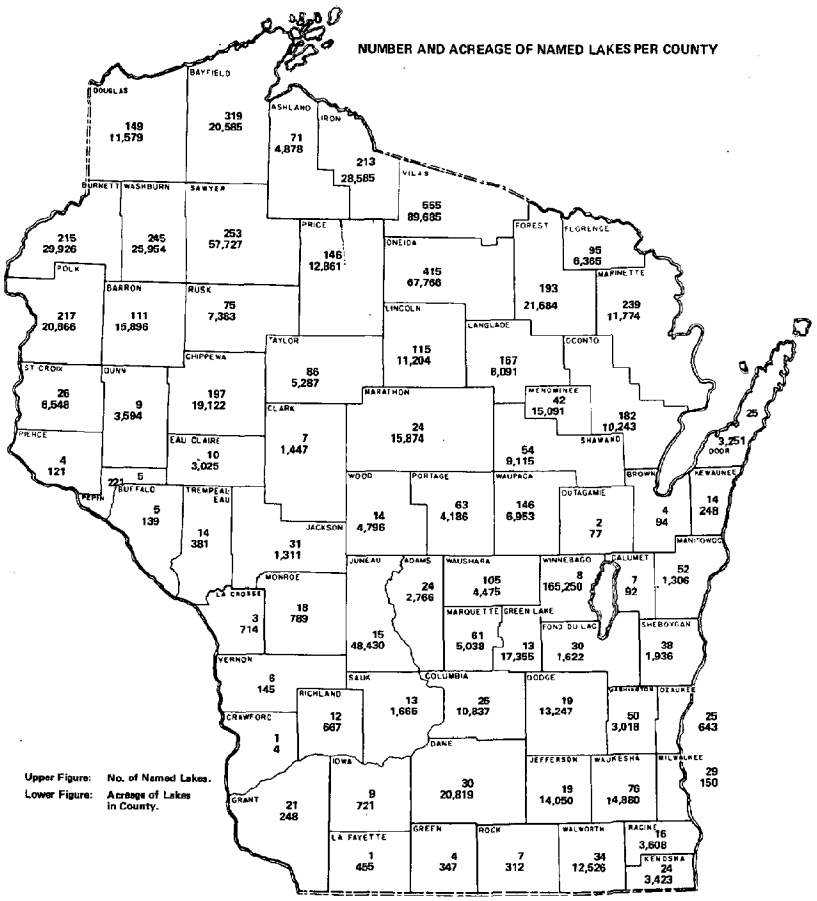
   Land use controls should be giving greater attention toward the control of direct and indirect discharges of nutrient-rich waters to lakes. Because of the variability in the size, characteristics, and cultural features of lakes, it will be necessary to identify legal structures which will have sufficient authority and responsibility for the effective management and regulation of lake water and shoreland quality.

2. The intrastate water quality standards are principally structured for managing rivers and streams. To provide a strong technical basis for the management of water quality in lakes, it will be necessary to intensify the water quality data collection program on lakes. Criteria for the control of nitrogen and phosphorus must be defined such that water quality standards can be developed.

3. Additional investigations are necessary to evaluate adequately the suitability of various technical alternatives for protecting, controlling and restoring water quality in lakes affected by eutrophication. Continued research and demonstration projects will be required on several phases if a comprehensive overview is to be developed.

4. A statewide early detection program is required for identifying lakes that are undergoing trophic changes, changes which may be corrected with the adoption of appropriate management and control measures. Some lakes should be designated for special protection.

5. Additional attention must be directed in future years to the quantities of nutrients reaching water courses from nonpoint sources. Highway construction, suburban development and agricultural activities are typical operations that will require study toward the development of effective control procedures.



# Thermal Pollution

## *What Has Been Done*

Thermal pollution is not considered to be a serious problem in Wisconsin at the present time. Where problems have occurred, investigations have been made and the problems remedied. State laws and administrative rules provide controls over heated water discharges.

Water quality standards for water temperatures have been established for all Wisconsin waters. They required that "streams classified by law as trout waters shall not be altered from natural background by effluents that affect the stream environment to such an extent that trout populations are adversely affected in any manner." When maintenance of fish reproduction is of primary importance in the public interest and natural conditions permit, the water temperature shall not exceed 84 degrees F. The water temperature shall not be more than 5 degrees F. higher than the natural unpolluted background water temperature at any time, and the rate of temperature change shall not exceed 2 degrees F. per hour. Where fishing is desirable in conjunction with other uses and natural conditions permit, the temperature shall not exceed 89 degrees F. for warm water fish. In addition, there shall not be an abrupt temperature change of greater than 5 degrees F. at any time. Authorization must be obtained for proposed installations where the discharge of a thermal pollutant may increase the natural maximum temperature of a stream by more than 3 degrees F.

There are 20 electric public utility and 5 rural electric cooperative steam electric generating plants in Wisconsin using water from inland rivers and lakes and border rivers and lakes for condenser cooling purposes. In addition, there are two Iowa and four Minnesota steam electric generating plants on border waters. On Lake Michigan, one nuclear powered electric generating plant has become operational and another is under construction.

Of the plants operating in Wisconsin, seven are on Lake Michigan, seven are on the Mississippi River, two each on Lake Superior, Rock River and Milwaukee River and one each on the Wisconsin River, Pine River, Fox River, Mill Creek, Menominee River and Lake Monona.

Seventy-six percent of the steam electric generating capacity in the state will be on Lake Michigan when the last nuclear unit is placed in operation about 1973.

Three of these plants will be nuclear fuel plants and the remainder are fossil fuel plants. Fortunately, all the large plants are located on large bodies of water.

Studies have been made of the temperature dispersion patterns at the fossil fuel power plants discharging into Lake Monona at Madison, Wisconsin, into Lake Michigan at Waukegan, Illinois, and into the St. Croix River at Stillwater, Minnesota. They show that the warmed water lays on the surface and does not readily mix with receiving water. The pattern of dispersion is affected by wind and currents and varies.

## *Problems*

Too high a temperature in the surface waters may have an adverse effect on fish and marine biota. The chief source of heated water discharges is from electrical power generating plants which take surface water for cooling and then discharge it back to the body of water at a temperature of 10 degrees to 20 degrees F. warmer.

The chief concern about power plants is that the average size of the plant is increasing and that the demand for electricity is doubling every 10 years. Thus, this remains a potential problem.

Problems created by the two major nuclear electrical power generating facilities constructed four and one-half miles apart on Lake Michigan in Wisconsin at Kewaunee and Point Beach will need to be surveyed.

There are approximately 175 industries in Wisconsin which at times discharge water at a temperature greater than 89 degrees F. Included in this category are cheese factories, canning companies, and paper mills. In general, no adverse effect has been observed on surface waters from these discharges. However, field investigations should be initiated at these sites and an individual assessment of the effects on the environment should be made. This would include fixing a zone of waste admixture.

## *Laws*

Chapter 144 of the Wisconsin Statutes grants the Wisconsin Department of Natural Resources authority to regulate thermal pollution.

Federal PL 92-500 in Section 104(t) relates to the study of effects of thermal discharges as does Section 316.

## *Regulations*

Detailed rules and criteria for the discharge of warmed water are contained in Chapters NR 102, 103 and 104 of the Wisconsin Administrative Code.

## *What Is Being Done*

The standards required by Chapters NR 102, 103 and 104 of the Wisconsin Administrative Code are met and are being enforced.

The Natural Resources Board approved revised thermal standards for Lake Michigan on December 8, 1971. They were published in the January 1972 Register and became effective on February 1, 1972.

The new thermal standards establish monthly maximum temperature criteria and a limit of 3 degrees F. over the existing temperature of the receiving water at the edge of an established mixing zone. Milwaukee Harbor,

Port Washington Harbor and the mouth of the Fox River are exempted from the monthly maximums because of the naturally occurring higher temperatures.

For existing or soon to be completed facilities that exceed a discharge of 500 million BTU per hour, it is required that the owners submit monthly reports of temperature and flow data, a detailed chemical analysis of blowdown waters, a preliminary engineering report for the installation of alternative cooling systems and the findings of a two-year study of the environmental and ecological impact of the discharges. The environmental study must be conducted in a manner approved by the Department, and it will aid in the establishment of a mixing zone.

Any new facility must be designed so as to avoid significant thermal discharge to Lake Michigan, and should existing discharges appear to threaten or cause environmental damage, the Department may order the reduction of thermal input regardless of interim measures undertaken by the source owners.

The Department of Natural Resources immediately notified the affected utilities of the reporting requirements of the new thermal standards. In addition, a committee was formed to develop guidelines for Environmental studies at Lake Michigan Thermal Discharge Sites. Included in the committee were two representatives from the University of Wisconsin-Madison, two representatives from the University of Wisconsin-Milwaukee and one representative from the University of Wisconsin-Green Bay. Copies of the guidelines were distributed to Wisconsin utilities and subsequent meetings were held by the Department of Natural Resources to determine the adequacy of the utilities proposed environmental studies.

At the present time, all of the reporting and environmental study requirements of the Wisconsin Thermal Standards are being complied with. The following status report lists the involved power plants and the dates various reports were received and preliminary study plans approved:

| Unit | Utility | Preliminary Eng. Report | Chemical Analysis Blowdown Waters | DNR Approval Env. Study | Monthly Operating Reports |
|---|---|---|---|---|---|
| Edgewater | WPL | 8/31/72 | 3/9/72 | 7/19/72 | Yes |
| Kewaunee | WPS | 8/2/72 | Nuclear Plant | 6/14/72 | Not in Operation |
| Pulliam | WPS | 8/2/72 | 8/2/72 | 6/13/72 | Yes |
| Point Beach | WEP | 8/1/72 | Nuclear Plant | 9/5/72 | Yes |
| Oak Creek | WEP | 8/1/72 | 7/31/72 | 9/5/72 | Yes |
| Lakeside | WEP | 8/1/72 | 7/31/72 | 9/5/72 | Yes |
| Port Washington | WEP | N/A | 7/31/72 | N/A | Yes |
| Valley | WEP | N/A | 7/31/72 | N/A | Yes |

N/A–Not applicable since not required in administrative code.
WPL–Wisconsin Power and Light Company.
WPS–Wisconsin Public Service Corporation.
WEP–Wisconsin Electric Power Company.

# Radioactivity Surveillance

## *What Is Not Being Done That Should Be Done*

1. Criteria for mixing zones have not been established.
2. Seasonal variations in natural water temperature ranges should be taken into consideration.
3. Thermal surveillance program around nuclear power plants may need to be expanded.
4. There is a need for further evaluation of aerial thermal sensing.

## *Recommendations*

1. Establish mixing zone criteria.
2. Consider seasonal variations in setting temperature standards.
3. Expand thermal surveillance program at nuclear power plants.
4. Evaluate use of aerial thermal sensing as a tool for thermal discharge surveillance and control.
5. Initiate field investigations to assess the environmental effects of industrial thermal discharges.

## *What Has Been Done*

The Department of Natural Resources, Division of Environmental Protection, has continued a surface water radioactivity monitoring program which was inaugurated in August 1959. Monthly samples are collected at 10 surface water quality monitoring stations and 1 sewage treatment plant. In cooperation with the Section of Radiation Protection, Division of Health, these samples are checked for gross alpha and beta radioactivity. Results of analysis are summarized and published at four-year intervals with the routine surface water quality monitoring data.

Other agencies, and at least one industry, determine the radioactivity of surface waters at specific locations in or adjacent to the state. The Public Health Service (PHS) has radioactivity monitoring stations on the Mississippi River at Dubuque, Iowa and Dam No. 3 at Red Wing, Minnesota and on Lake Superior near Duluth. Milwaukee has a counter to continually monitor its water supply from Lake Michigan. At least one of the paper mills with a customer in the photographic film field monitors water and air.

Natural radioactivity is present in surface waters because of solar radiation and natural radioactive minerals in the earth's crust. Some radioactive isotopes, both man-made and natural occurring are used at medical, industrial, and research institutions. However, the quantity used for these purposes thus far in the state and limitations placed on their final disposal by licensing agreements with the Atomic Energy Commission (AEC) result in a negligible increase in surface water radioactivity. The major fluctuations found in surface water radioactivity can be attributed to fallout from the testing of nuclear devices. The mean gross radioactivity at 10 monitoring stations in Wisconsin during 1969, 1970, 1971, and 1972 was 6.43, 6.55, 7.69 and 6.03 pico

curies per liter. The mean alpha radioactivity for the same stations was .04, .13, .13 and .09 pico curies per liter. For drinking water, a gross beta count of 1,000 pico curies per liter is grounds for rejections of the supply, except where more complete analysis shows that the concentration of nuclides is not likely to cause excessive exposure.

## *Problems*

With the start up of a small nuclear power plant on the Mississippi River near Genoa, Wisconsin and the construction of two larger nuclear power plants on Lake Michigan, there is potential for radioactive pollution from these sources. Neighboring states also have nuclear plants in various stages of construction in adjacent waters. One plant is under construction near Red Wing, Minnesota on the Mississippi River, and a total of six nuclear plants will eventually be operational on Lake Michigan. The Atomic Energy Commission claims that their agency has the exclusive and primary responsibility for regulation of radiation hazards for the protection of the public health and safety in the peaceful use of atomic energy; i.e., source, by-product and special nuclear material.

The Federal courts have ruled that the Atomic Energy Commission has primary jurisdiction on regulating radioactive discharges from a nuclear power plant.

## *Laws*

1. Wisconsin Chapter 144 (Water, Ice, Sewage and Refuse).
2. Wisconsin Sections 140.50 - 140.60 (Radiation Protection Act).
3. Atomic Energy Commission–a. Public Law 585, 60 Stat. (Atomic Energy Act of 1946); b. Public Law 83-703, 68 Stat. (Atomic Energy Act of 1954); c. Public Law 88-487 78 Stat. (Private Ownership of Special Nuclear Materials Act.)

Regulations

1. Wisconsin has adopted water quality standards and use designations, and they are incorporated in the Department's administrative code. Reference to radioactivity appears in the water quality standards as follows:

"NR 102.01 (3)....The U.S. Atomic Energy Commission Rules and Regulations, Title 10, Part 20, Standards for Protection Against Radiation, December 22, 1965, will apply to the disposal and permissible concentrations of radioactive substances."

2. Wisconsin Administrative Code, Section H57, Radiation Protection Code.

## *What Is Being Done*

To control radioactive contamination, the Atomic Energy Commission maintains a licensing system based on an evaluation of specific activities of radioactive substances in the surrounding area and the type of wastes to be discharged.

At each nuclear reactor, the involved power company is required by the Atomic Energy Commission to maintain a pre-operational and post-operational radiological monitoring program. Phases of the environment surveyed are air, precipitation, river or lake water, well water, soil, silt, vegetation and milk.

The state agency having the primary responsibility for environmental radiological surveys is the Section of Radiation Protection, Department of Health and Social Services. In cooperation with the Division of Environmental Protection, samples are collected of all phases of the nuclear power plant environment and analyzed by this section. Unusual samples, such as fish, algae or bottom-dwelling organisms, are also included in the program. For each of these independent surveys, the samples are generally checked for gross alpha and beta radioactivity and gamma scan. Should these be significant, then determination would be made of specific radionuclides. A pooled milk sample from area farms is routinely analyzed for Iodine-131, Barium, Lanthanum-140, Cesium-137, Potassium-40, and Strontium-90. Air is sampled continuously, and all other analysis is based on intermittent samples.

Once the nuclear reactors are operating, radioactivity is intermittently released to the environment at a controlled rate well below the limits prescribed by the Atomic Energy Commission. These limits coincide with the limits put forth in Wisconsin's water quality standards. The routine monthly monitoring program of the Department of Natural Resources is an ongoing program that is being maintained.

The Section of Radiation Protection, Division of Health, conducts selected joint inspections of AEC licensees with AEC regional staff.

## *Recommendations*

1. The Department of Natural Resources radioactivity monitoring program should be expanded as additional radioactive source dischargers are located in the state.
2. The state should become an agreement state under AEC to provide for more complete surveillance of radioactive substances used in the state.

# Pesticides

## *What Has Been Done*

Wisconsin officials have long recognized the need for interdepartmental cooperation in developing and administering pesticide use control programs.

In the mid 1950's, University of Wisconsin researchers substantially improved analytical procedures for the identification and quantification of chlorinated hydrocarbon pesticides. The technique employed was by the gas chromatograph with electron capture detectors. This analytical improvement resulted in the confirmation of potential environmental problems associated with the persistence of these pesticides. University of Wisconsin researchers further established the biological magnification characteristics of chlorinated hydrocarbons in Wisconsin birds and mammal populations; the Wisconsin Conservation Department established significant sublethal residues in fish population; and the Wisconsin Department of Agriculture established residues on seeds and food products. By the late 1960's, citizen interest in this field led to a ruling that DDT could be considered a form of water pollution under Chapter 144 of the Wisconsin Statutes. With this concern in mind, the Federal-State Lake Michigan Enforcement Conference established a Technical Committee on Pesticides charged with evaluating pesticide residues and their implications in the Lake Michigan ecosystem.

The Governor of Wisconsin along with the Governors of Illinois, Indiana, Michigan, and Minnesota established an interdisciplinary committee on pesticides charged with developing compatible pesticide control programs among the various states and consistent with the needs of agriculture, conservation, and health. This Committee was the first to attempt a statistical evaluation of agricultural and urban use of pesticide. The Committee also recognized the threat of nonpesticide toxicants such as PCB's, lead, and cadmium which require environmental monitoring and health related interpretations.

Wisconsin was the first state to ban the sale, use and transportation of DDT by Statute (except under emergency conditions). After the passage of this Act, the Department of Natural Resources conducted a collection of DDT through its field stations and about 35 tons of that pesticide and others were collected. Also, passage of another bill created a pesticide Review Board and a Technical Advisory Committee which has worked diligently with the resultant approval of two regulations affecting agricultural controls over pesticide use and natural resources controls over nine chemicals named as "restricted use pesticides," namely: DDT DDD (TDE), Endrin, Aldrin, Dieldrin, Heptachlor, Lindane, BHC and Alkyl Mercury products. Also, the Department of Natural Resources ruling on DDT was sustained after "oral arguments" were made before the Secretary on August 25, 1970.

## *Problems*

The compounds used as pesticides, often useful to one segment of the social community, may have a serious adverse effect within the complex environmental structure. The inherent governmental organization typically has the benefited group regulated by one agency and an injured group regulated by a second governmental agency. The two concerned regulatory agencies simply find it difficult to arrive at cost-benefit formulas that permit the essential uses and prohibit undue resource damage. Typically the Legislature is called upon to resolve highly technical questions under an outcry of charges and counter charges.

The agencies in Wisconsin concerned with pesticide regulations have long recognized this difficulty and have established interagency committees to resolve technical evaluation difficulties associated with pesticide use programs. The Pesticide Review Board and Pesticide Council as created by Chapter 146, Laws of 1969, was perhaps the most significant step in resolving this difficulty. The creation of the Pesticide Review Board offers a vehicle to the agencies to develop technically sound regulatory programs through an interagency cooperative process.

## *Laws*

1. Ban of DDT-Section 134.67, Wis. Stats.
2. Establishment of Pesticide Review Board-Section 15.195, Wis. Stats.
3. Registration Act-Sections 94.67-94.71, Wis. Stats.

## *Regulations*

Wisconsin Administrative Code:

1. Chapter AG-29 (Agricultural Rules)
2. Chapter NR-80 (Natural Resources Controls on "restricted use pesticides")
3. Section NR 151.10 (Solid Waste Disposal Rules)
4. Chapter NR 102 (Water Quality Standards)

## *What Is Being Done*

In conjunction with the pesticide evaluation programs, the Lake Michigan Enforcement Conference and Governor's Interdisciplinary Committee on Pesticide both recognized the toxic nature of a wide variety of compounds not associated with pesticide use but often similar to pesticides in structure, persistence, and toxicity. Polychlorinated bi-phenyls (PCB's), phthalates and trace metals including mercury have all been the subject of extensive field investigations. Selected water supplies have been evaluated for trace metals, a fish monitoring program for pesticide and mercury continues in effect on selected rivers, Lake Michigan and Lake Superior. PCB's have been a subject of industrial and municipal waste evaluation. A trace metal and phthalate study of wastewater and industrial wastes has recently been initiated to isolate those sources that warrant regulatory action.

With regard to legislation, the Federal government has recently enacted the "Federal Environmental Pesticide Control Act" which will result in minimum regulatory standards throughout the United States. Wisconsin already meets virtually all the minimum standards except for licensing of pesticide applications. This legislation will be proposed to the 1973 Legislature.

What Is Not Being Done That Should Be Done

The regulation of pesticide applications has long been a weakness of the Wisconsin Pesticide Control Program. If Wisconsin does not proceed with this regulation, the Federal Law of 1972 will preempt the Wisconsin agencies from this activity. The Wisconsin agencies should meet this obligation and particularly the training of pesticide applicators.

One of the principal technical weakness of the pesticide regulatory program has been the inability to estimate quantity of pesticide used and where they were used. It becomes more apparent that some type of system is needed to document where, when, and how much pesticides are used. It is only by such a system that sound pesticide management and pesticide control programs can be developed.

## *Recommendations*

1. The proposed legislation for licensing applicators should be adopted.

2. The several state agencies establish a system of documenting the where, when and how much pesticides are used.

# SURFACE WATER QUANTITY
# Water Regulatory Programs

## *What Has Been Done*

The legal principle, known as the trust doctrine, has been followed from the early establishment of the water rights for Wisconsin. Water policies of the state in regard to water rights have evolved directly from the Northwest Ordinance of 1787. The trust doctrine maintains that all navigable waters are held by the state in custody for all citizens.

The statutory test of navigation was altered in 1959 to consider a watercourse as navigable if it is capable of floating the shallowest boat, skiff, or canoe used for recreational purposes at regularly occurring intervals throughout its length.

In its enabling legislation, Wisconsin followed the main principles of this doctrine, but modified it to the extent that while the state keeps custody of all waters for the public, it has true ownership of the beds of only navigable lakes. Beds of navigable streams are owned by the riparian, however, the ownership is qualified because the state remains custodian of the water which flows over the bed. This custodianship gives the state the authority to control anything which affects the natural character of water. Thus the trust doctrine has become the main principle which governs all the laws which regulate water in the state.

The Department of Natural Resources has responsibility as set forth in Chapters 30 and 31, Statutes, to regulate certain uses, developments, or modifications of the surface waters of Wisconsin.

Department jurisdiction regarding the water regulatory programs depends in most instances on the existence of navigable water. The importance is primarily caused by the high degree of public interest associated with navigable waters. Some exceptions to the dependence upon the existence of navigable waters include dams on nonnavigable streams, diversions and enlargements of waterways within 500 feet of navigable streams, but not connected to the waterways.

Authority extended to the Department of Natural Resources in Chapters 30 and 31, Statutes, includes water regulation approvals, contracts, and permits. Procedures to be followed in reviewing proposals requiring authority from the Department of Natural Resources are also established in the Statutes and vary from authority to authority. In some instances, authority can be granted after internal review has been made of the proposal by Department staff. In other instances, in addition to the internal review, a public notice is required along with a waiting period during which public response can be noted prior to issuance or denial of the requested authority. The most formal review procedure includes internal review, public notice followed by public hearing, and issuance or denial of the requested authority.

The Department is also responsible for a surveillance and enforcement program required to take action against unauthorized or illegal acts or action which has occurred beyond prescribed authority.

The Department of Natural Resources has issued many permits and contracts for the removal of material from the bed of waterways. Where the state does not own the bed of the waterway, permits are issued. In natural lakes where the lakebed is state-owned, the removal is authorized by the sale of material under the terms of a contract. The permit law came into being in 1966. The purpose of these laws is to protect the public from the dangerous excavations on the beds of waterways and protect the environment from damaging projects.

Permits have been issued for at least six major projects wherein lakes are to be constructed for commercial land development. When a lake is created for real estate purposes there is an automatic conflict of interest between the developer and the state. The developer is interested in completing the project and disposing of riparian lands soon after development. The state has a continuing interest in the maintenance of the dam, the impact of the real estate development on the new flowage and other natural resources values in the project vicinity. The state's responsibilities for a created lake continues far past the time that developers have terminated their interest.

Wisconsin has approximately 1,400 dams on navigable waterways, all of which exist under some form of authority. Since 1935 there have been requirements relating to the approval of plans for these structures. The Department of Natural Resources maintains a staff of engineers who evaluate plans for proposed dam construction and for major repair or modification of existing dams.

## *Problems*

In the past lake creation projects have been located on land that was not suitable for the installation of adequate private sanitary disposal systems. Other lake development projects have been proposed in natural areas where the existing features and values would be lost or replaced by different values. From the experience gained on several proposed projects it is apparent that the present legal structure does not permit a developer to organize and complete a project without encountering great financial risks. In most cases the developers obtain options for the land before an agency permit is issued. Should the option period expire before the permit is issued, the developer must renegotiate for the land. During the initial stages of project development, the developer has only general plans for the project. As such, the lack of detailed information poses substantial problems for the reviewing departments, and there is a reluctance to provide advice as to the status of approval until all aspects of the project have been investigated. As a result

these uncertainties often cause misunderstandings between developers and the regulatory agency.

Many potentially dangerous dams exist in Wisconsin because they were constructed prior to the establishment of required detailed plan approval. In addition to uncertainty regarding design and construction practices, many dams that have been designed and constructed properly are potentially unsafe because of age. Further difficulties have resulted from the changes in ownership which have commonly occurred during the past decade because of the diminishing value of small hydropower installations. In many instances the new owners are inexperienced regarding the necessary operation and maintenance of the dams which they have acquired. In many instances the operating pattern of the dams has changed from power production to the maintenance of pond levels for recreational activities. Such change often results in less frequent operation of spillway and gate equipment and increases the possibility of equipment malfunction during periods of increased stream flow.

Problems which have been encountered in lake renewal and management activities are numerous. No approach to organizing local interests in a manner appropriate to the needs of a lake renewal or management project exists at this time in Wisconsin Statutes. Some programs have been undertaken by local interests who have organized as sanitary districts. A mandatory organization which has the ability to generate financing is required to cooperate with state and federal sources of technical and financial assistance.

Wisconsin's remaining undeveloped shorelines are receiving increasing pressure as the public seeks water related recreational opportunities. The unrelenting erosive actions of water is continually reducing the amount of lake and stream related wetlands in several major water systems within the state. Examples of this process exist in the lake edge wetlands adjoining the Lake Winnebago pool system, the Upper Fox River system, and Lake Koshkonong which are being eroded by wave and ice action.

Proposals have been made during the past several years for the establishment of bulkheads along major reaches of shoreland at several locations within the state. The establishment of bulkhead lines allows for the placement of fills provided they are placed in a manner consistent with other appropriate regulations. These fills, if placed, would effectively eliminate major wetland systems which exist adjacent to the navigable waterway. Substantial adverse environmental impact potential exists in these proposed bulkhead lines. Recent changes in rules governing the disposal of harbor dredging spoils has increased the pressure on the Great Lakes related wetlands.

In several instances Department projects are underway to protect the lake edge of the wetlands from further erosion. Authority has been granted to private individuals for several similar projects.

Channelization of waterways poses a potential adverse impact on Wisconsin's water resources if it is not used wisely. Stream straightening, a common practice, tends to shorten the length of the stream thereby directly reducing the amount of aquatic environment available. Further, reduction in quality of the aquatic environment results from the standard cross section created in the interest of hydraulic efficiency which increases the downstream velocity. This accelerated water movement often times compounds downstream flood problems. Special care must be exercised to assure that unstable conditions are not created by a channel change which causes a different water surface profile under similar flow conditions.

Artificial channels connected to lakes and streams for real estate development have the effect of reducing the relative rights of other riparians on the affected water body. Water quality problems associated with such enlargements must be considered in a most careful way to avoid damage to the public interest.

## *Laws*

Chapters 30 and 31 Wisconsin Statutes provide for the approvals, contracts and permits related to water regulatory programs such as bulkhead lines enlargement and protection of waterways and removal of materials from the bed of navigable waterways.

## *Regulations*

Chapter NR 115 Wisconsin Administrative Code, Wisconsin's Shoreland Management Program.

## *What Is Being Done*

Recent legislative actions have required changes in application, investigation and review procedures for water regulatory programs. Environmental impact review is now required for projects involving more than 40 acres of land or $25,000. Environmental impact review is required also for major actions by the Department of Natural Resources. Therefore, environmental impact review procedures have had to be integrated into water regulatory program review and investigatory procedures.

The Department of Natural Resources in administering the law related to lake creation provides a staff to consult with land developers and affected municipalities. Questions relating to the suitability of site soils and slopes for development are referred to the Department of Health and Social Services. Environmental impact review leads to more formal consideration of the existing resource values at a project location, increases the obligation of the developer to provide detailed information on the proposed project, and requires a more rigorous analysis

of the impact of a proposed project on the resource values identified in the project vicinity.

A dam safety engineer has been added to the Department of Natural Resources staff. The responsibility for routine annual dam inspections is being reassigned to the district offices. Detailed inspections will be conducted at dam sites which are indicated by the routine annual inspections as requiring special attention. Close contact is maintained by the dam safety engineer with the U.S. Army Corps of Engineers and the Federal Power Commission regarding dam operation and safety programs.

A lake renewal and management demonstration project jointly managed by the University of Wisconsin and the Department of Natural Resources has been active since 1968. The program has demonstrated ways in which interested parties and organizations could be organized to work toward the solution of lake management problems. The success of the demonstration activities has received high recognition and a continuing program is under consideration.

Water regulatory staff have cooperated with Department of Natural Resources information and education staff and have prepared general information material for the purpose of increasing public awareness of the state's water regulatory programs. Additional information has been prepared to guide inquiries and applicants to proper Department of Natural Resources district and area offices.

## *What Is Not Being Done That Should Be Done*

To provide for the effective implementation of the state's water regulatory program a uniform hearing and permit procedure should be authorized.

Studies are necessary to determine the environmental impact of modifications made to waterways and wetland areas, and to identify sites that have potential for recreational land development.

Changes should be made in the law to provide sufficient lead time for informal discussions between state agencies and applicants proposing to create a lake. Plans for dams can be submitted for agency review without the seal of a professional engineer and the Department of Natural Resources is not empowered to require that a resident engineer be present on all major projects to assure compliance with the approved plans.

Continued and increasing use of lakes has accelerated the aging process and related deterioration of lake and lake-related shoreland environments. A trend has developed to approach lake renewal and management activities on a more comprehensive and rational basis. Management methods are under development to attack lake problems on an entire smaller lake or on larger areas of intensively used littoral zones in larger lakes. Legislation has been proposed which would transfer that demonstration activity into an ongoing responsibility within the department of Natural Resources, the University of Wisconsin, and other agencies. The proposed legislation would also allow for the formation of local govern-

## *Recommendations*

1. Legislation should be developed for the establishment of uniform hearing and permit procedures appropriate for all water regulatory programs.
2. Studies should be conducted to identify the impact resulting from modification to waterways and wetland areas commonly approved by the agency, and to determine the legal rights of riparians.
3. Studies should be conducted on an interagency basis to determine which sites have potential for recreational land development.
4. At the present time Chapter 31, Statutes, requires that an application for a permit to construct a dam be set for a hearing within six weeks from the time of application. The law should be amended to provide a greater lead time and require formal discussion between the staff and applicants.
5. At the present time municipalities acquiring dam projects must rely upon the general tax base for money to maintain the structures. Section 31.38, Statutes, provides an assessment procedure to limit the apportionment of costs to the benefited property. Section 31.38, Statutes, should be clarified to provide a more direct approach. The law should be tailored to the needs of this type of development.
6. Consideration should be given to preserving the potential high value sites for future development by public or private agencies either through acquisition programs or land use regulations.

*Continued on page 43*

# Research and Data Collection

mental organizations to initiate and carry out lake reclamation projects. Funding programs are also included in the proposed legislation.

Although technical expertise exists throughout the state within the several agencies of the state and federal government, no clear instructions exist at this time regarding the use of this technical assistance in an organized lake renewal and management program. In addition to the need to employ the knowledge of technicians currently working with lake resources, it will be necessary to assign a team of resource specialists to provide technical assistance on lake renewal and management practices.

More stringent regulations regarding the disposal of polluted dredging spoils resulting from harbor maintenance programs around the Great Lakes prohibits the disposal of these spoils in deep-water disposal sites formerly employed. Therefore, new disposal sites need to be developed. Because of the expense involved in pumping or elevating these dredging spoils to high upland sites, in many instances shallow areas of the littoral zone or Great Lakes related wetlands are being considered as disposal sites. The potential adverse environmental impact resulting from such a proposal needs to be carefully analyzed.

## *Recommendations* —*Continued*

7. Land use plans associated with a project should conform to the standards of concerned agencies. Review of proposals for lake creation should be conducted by an interagency team.

8. The law should require that all plans for dams be sealed by a registered engineer because hazard to human life and property is involved.

9. The Department should be empowered to insist that a resident engineer be present on all major projects to assure compliance with the approved plans.

10. Where a dam is illegally installed, no permit should be issued until after the dam is removed.

11. Legislation to establish and support an ongoing lake renewal and management program in the state to complement a recently enacted federal law should be given close consideration.

12. Regulations should be established to encourage the maintenance of natural shorelines for all of Wisconsin's inland lakes and further regulations be sought to establish sensible use of small lake waters by its users.

13. An intensive study is necessary to determine methods for deposing or utilizing polluted lake dredging spoils so that the unique values associated with shallows and wetlands bordering the Great Lakes are not adversely altered.

## *What Has Been Done*

Wisconsin has a plentiful supply of surface water in its many streams, lakes, and wetlands, although it varies considerably in time and locations. Monitoring of this variability in quantity is essential for a variety of purposes including flood control, flood plain and shoreline zoning, waste transport, design of structures built over and in streams, water based recreation, and many other purposes.

The State of Wisconsin has been collecting information on its surface waters since the early 1900's. In 1913 a formalized cooperative program of surface water monitoring and appraisal was initiated with the U.S. Geological Survey. This program, considerably expanded, is still in effect and is the principal source of statewide streamflow data available. The program is supported on a cooperative basis currently by the Wisconsin Department of Natural Resources, the Wisconsin Department of Transportation, the Southeast Wisconsin Regional Planning Commission, the U.S. Army Corps of Engineers, and several power companies licensed by the Federal Power Commission. The data has been published in various state and U.S. Geological Survey reports and is in the files of the cooperating agencies.

Surface water quantity has been measured and computed for many flood control projects and hydrologic studies in parts of the state by the U.S. Army Corps of Engineers, the USDA Soil Conservation Service and Agricultural Research Service, the Northeastern Wisconsin Regional Planning Commission, the Southeastern Wisconsin Regional Planning Commission, the Wisconsin Department of Natural Resources, and the Wisconsin Geological and Natural History Survey.

## *Problems*

With the recent emphasis on environmental quality, resource management,

and flood plain and shoreline zoning, sufficient long-term data on lake levels and streamflow characteristics are not available and adequate methods to synthesize and correlate these data are not being developed to meet present and future planning and management needs.

Planning and design of structures over or in water courses, flood plain and shoreline zoning, maintenance of fisheries, regulation and planning for withdrawal use and waste transport, control of water quality, effects of urbanization on streamflow, and many other aspects of planning and management require detailed long term data on streamflow and stage. Although an extensive stream gaging network is now maintained by the U.S. Geological Survey in cooperation with state and federal agencies, additional gaging stations are needed in key locations especially on small streams. Research is needed to develop mathematical tools to synthesize streamflow characteristics, including both flood and low flow in areas where actual data are not available. Stream models should be developed that can analyze streamflow together with other parameters of an entire river system rather than depending on uncorrected data from individual gaging or sampling stations.

## *Laws*

Current laws are adequate for state agencies to carry on research and data collection programs on surface water quantity. Of particular significance are the following.

ss. 36.29(4) Directs the Wisconsin Geological and Natural History Survey to survey the water powers of the state. This survey may be made in cooperation with the U.S. Geological Survey.

ss. 26.30(4) Directs the Wisconsin Geological and Natural History Survey to investigate the water powers of the state by collecting data on streamflow, stream profiles, studying effects of drainage of lands on streamflow, and by other necessary and expedient investigations.

ss. 36.245 as amended by Chapter 614, Laws of 1965. Funds are made available to the Department of Natural Resources and the Wisconsin Geological and Natural History Survey for a joint accelerated water resources research and data collection program coordinated by the director of the Water Resources Center.

ss. 87.30 Directs county, city, and village governments of the state to adopt reasonable and effective flood plain zoning ordinances by January 1, 1968. If not, the Department of Natural Resources will adopt such an ordinance.

## *Regulations*

NR 116, Wis. Adm. Code, Flood Plain Zoning.

## *What Is Being Done*

The U.S. Geological Survey in cooperation with several state and federal agencies maintains a network of gaging stations that continuously monitors streamflow at over 100 sites on Wisconsin streams, and water levels for 15 lakes. Since the early 1900's the Survey has collected daily streamflow data at a total of 205 sites and water levels at 66 lakes and reservoirs. Information on peak flows is being obtained at about 135 sites and on low flow at about 300 sites on small streams throughout Wisconsin. Sediment load data is being obtained for 25 streams and its relation to discharge, the geology of the basin and other environmental factors is being studied. In addition, special studies are being made of flood frequency. Flood plain inundation, low flow characteristics of streams, effects of impoundments on streamflow, and the runoff characteristics of urban areas. The results of the data collection and investigations are published making the information readily available for all water planning and management agencies and groups.

The U.S. Army Corps of Engineers is presently conducting a survey in the Rock River basin to determine water problems, including flood control, and recommended solutions to these problems. Several peak flood discharge and flood inundation studies are being conducted in the state by the Corps.

The USDA Soil Conservation Service is presently conducting a water needs study covering most of the eastern half of the state. The study will point out surface water quantity problems, largely flooding, and recommend remedial measures primarily relating to PL-566.

The Department of Natural Resources, under its statutory responsibility of flood plain management, is conducting studies to determine peak flood discharge and flood inundation on many streams of the state.

## *What Is Not Being Done That Should Be Done*

Things that should be done in the field of surface water quantity include increasing the acquisition of basic data, especially on specific aspects of the state's surface water systems and developing more effective methods of interpreting the quantity data as well as extrapolating, and integrating the data with other parameters.

Additional data are needed on flow characteristics of small streams and of regulated streams; low flow and flood flows of streams; the relationship of streamflow and lake levels to the ground water regimen and quality of water; the effect of geology and geomorphology on streamflow and sediment yields; and the effects of streamflow and lake levels on aquatic fauna and flora. Interpretive tools are needed to effectively extrapolate data to areas where data is not collected, to effectively predict low flows and flood flows, to determine effects of urbanizations and other developments on streamflow, and to integrate streamflow quantity information along with other hydrologic information into river system models.

## *Recommendations*

Recommendations for surface water quantity center primarily around increasing specific data acquisition and developing mathematical tools for integration of quantity information with other parameters. This can be accomplished by expanding the data gathering and research effort now in progress under state-federal cost sharing programs.

1. Expand data gathering network to collect information on flow characteristics of small streams and on regulated streams.

2. Expand data acquisition on flood flows and low flows of streams.

3. Develop the mathematical tools to synthesize from other measurable characteristics, such as geology and geomorphology, data on streamflow characteristics for streams where flow data are not available.

4. Develop mathematical models on entire river systems including quantity as well as other surface and ground water parameters that affect flow.

5. Analyze by mathematical model regulated stream systems.

6. Analyse effects of urbanization and other developments on surface water quantity.

7. Conduct time-of-travel studies on selected streams to determine rates at which dangerous pollutants might travel if accidental spills occur.

8. Expand the work on identifying flood-inundated areas as an aid to flood plain zoning regulations.

9. Expand work in the monitoring of lake volume and area and relate lake stage fluctuation to hydrologic factors.

10. Integrate surface water quantity data into a state water-data system.

# GROUND WATER Quality

## *What Has Been Done*

The determination of ground water quality has been an ongoing program since the Laboratory of Hygiene was formed in 1903. The 1935 report on "Public Water Supplies of Wisconsin," compiled by the State Board of Health and Laboratory of Hygiene, presented data on water quality at that time. During the summer of 1966, an aggressive program of the Department of Resource Development and the Laboratory of Hygiene resulted in the collection and analysis of samples from essentially all public wells in the state. A report based on this data is now available. A plan for periodic sampling and analysis of all public water supply wells on a five-year cycle is now being implemented.

In addition to the usual chemical analysis of samples, the sodium and potassium content of all public supplies were determined in 1965. The sodium results were reported in the Wisconsin Medical Journal, August 1966. Partial or complete analysis of public well water samples are provided as determined necessary by the Department of Natural Resources and utility management personnel.

Private well supplies normally are not examined chemically. On special request from user, owner, or public health officers, limited tests such as hardness, iron or nitrate are made. Recently a random selection of private well samples submitted for bacteriological analysis have been examined for nitrate content.

Routine bacteriological examinations of public supplies are made at the Laboratory of Hygiene or at approved municipal and private laboratories. A water sample from each new municipal well is examined bacteriologically and chemically upon completion of the well and at regular intervals thereafter. Private well supplies are examined bacteriologically only as requested by owner or user, except that all new private wells are required to be sampled for bacteriological examination upon completion of the well.

Samples from 966 public supply wells were examined chemically in the 1966 survey. A summary of the results as related to the United States Public Health Service Drinking Water Standards is given in the following table:

| | U.S.P.H.S. Standard Suggested Maximum Content (mg/l) | Percent of Samples Above Suggested Maximum Content | Maximum Content Found (mg/l) |
|---|---|---|---|
| Chloride | 250 | 0 | |
| Fluoride | 1.7 | 2.5 | 7.0 |
| Iron | 0.3 | 38.6 | 9.4 |
| Manganese | 0.05 | 20.8 | 4.2 |
| Nitrate (as N) | 10.0 | 0 | 9.7 |
| Sulfate | 250.0 | 2.6 | 1130.0 |
| Total Solids | 500.0 | 8.5 | 1930.0 |

Iron and manganese exceed the suggested maximums in a high percentage of the wells, and treatment to reduce these levels is satisfactorily accomplished in many supplies. In some communities water from several wells is blended to obtain a supply that meets the standards.

During 1970 and 1971, samples from 53 public ground water supplies were examined chemically for ammonia, arsenic, barium, boron cadmium, chromium, copper, cyanide, lead, mercury, silver, and zinc plus the constituents commonly determined in routine chemical examinations. The results of the study indicated that these trace elements generally do not present a problem. Only the barium content in one supply exceeded the accepted maximum standard and after the usual treatment, the level decreased to an acceptable value.

The bacteriological quality of ground water serving public supplies is based on examinations of the water as supplied in the distribution system. During the 1969-70 fiscal year, 5.2 percent of the samples examined at the Laboratory of Hygiene were bacteriologically unsafe. These unsafe reports included samples from new mains, samples taken following repairs to broken mains, and various other unusual samples in which the likelihood of contamination is high.

The Wisconsin Geological and Natural History Survey since its inception, and more recently (1946) through its cooperative water resources program with the U.S. Geological Survey has made studies of the chemical quality of ground water in the principal aquifers of the state as part of its quantitative ground water studies. A recently completed water resources study of the 12 major river basins of the state, summarized by maps and tables chemical quality of ground water in bedrock and glacial aquifers for the entire state. A ground water quality monitoring program by the two surveys has been in effect for about 7-8 years. This program was recently expanded to include 85 observation wells and 26 springs that are sampled annually for complete chemical analysis. The program is designed to determine baseline quality and to monitor changes in quality where problems and/or changes are known or anticipated.

## *Problems*

High levels of iron, manganese, and hardness, and corrosive tendencies, in public well supplies are the major chemical quality problems. Treatment methods for each of the above problems are known but not applied statewide.

Very limited information is available concerning the chemical quality of private supplies. There is no regular program of analysis of these wells. It is known that great variation occurs in all the normal constituents found in ground waters. Recent studies of the nitrate content of private wells on a statewide sampling for a three-month period shows that 8.5 percent of the samples were above the recommended drinking water standard of the Public Health Service. Sampling of a large percentage of the private wells in Dane and Columbia Counties showed that approximately 40 percent of the samples had nitrate concentrations higher than the recommended standard. Two and one-half percent of all samples from new private wells during the past year showed nitrate levels above the recommended value of 45 mg/l (10 mg/l as nitrogen).

During the past four years, 16.6 percent of the private samples examined were unsafe. This value is misleading, since many well owners that receive an unsafe report promptly take another sample and ask for a repeat examination. If it is again unsafe, they may take a third or fourth sample. Thus from one well there may be several unsafe tests. Private samples are usually taken by the home owner or tenant, who may have little knowledge or experience in bacteriological sampling. There is little doubt that some of the samples are contaminated as they are taken.

Spillage of petroleum products and leakage of storage tanks appear to be causing a considerable increase in requests for assistance. Presently we have no satisfactory analytical procedure for determination of trace amounts of petroleum in water.

Delays in receiving bacteriological samples at the Laboratory of Hygiene present a continuing problem. Standard methods for the Examination of Water and Wastewater specify that no more than 30 hours should elapse between sampling and the initiation of the bacteriological test. A considerable percentage of the bacteriological samples fail to meet this time standard. Presently a 48-hour limit on age of samples is used as a practical alternative. It is believed that such a modification of standards is unsatisfactory.

## *Laws*

Section 36.225, Wisconsin Statutes, establishes the Laboratory of Hygiene and provides that it shall furnish complete laboratory services to the Department of Natural Resources and the State Division of Health.

Sections 36.29(4) and 36.30(4), Wisconsin Statutes, assigns the responsibility for studying the water resources of the state to the Wisconsin Geological and Natural History Survey. These studies include quality of ground water.

## *Regulations*

See p. 50–Regulations.

## *What Is Being Done*

Chemical and bacteriological examinations of all new public supply wells, and periodic examinations of existing wells are presently made.

Bacteriological examinations of new private wells are required by the well drilling code. Examinations are also made when requested by well drillers, owners, users or inspectors. Limited chemical examinations are made when specifically requested to solve a problem or difficulty.

## *What Is Not Being Done That Should Be Done*

Broaden the periodic chemical examinations of public supplies to include various other items listed in the United States Public Health Service Drinking Water Standards, which are not now a part of our regular chemical examination. These include ammonia, arsenic, copper, boron, cyanide, phenol, zinc, barium, cadmium, chromium, mercury, lead, selenium, and silver.

A study should be done of methods of prevention and removal of petroleum product pollutants in ground water and the development of satisfactory analytical procedures for identification and determination of trace quantities of these pollutants.

A research study should be done on the sources and methods of removal of specific types of taste and odor problems that occur in private supplies.

## *Recommendations*

1. The periodic chemical survey of public water supplies should include all that is listed in the U.S. Drinking Water Standards.
2. Establish a study to evaluate the problem of delayed receipt of samples intended for bacteriological analysis.
3. Conduct a research study on sources and methods of removal of specific types of taste and odor problems that occur in private wells.
4. Broaden the sampling of waters from private wells for nitrate analyses, to determine changes that may be occurring. Increase in monitoring should be controlled, taking into consideration well construction, aquifer, geographical location and land use practice at the site.
5. Develop analytical procedures for identification and estimation of trace amounts of petroleum product pollutants in ground water.

# Quantity

## *What Has Been Done*

Ground water in Wisconsin is a resource of major magnitude. The volume of water stored beneath Wisconsin's land surface is about 900 cubic miles. This volume is more than 100 times the annual discharge of all Wisconsin's streams.

Although very large in aggregate volume, ground water storage is greatest in the southern, eastern, and southwestern parts of the state, where the saturated thickness of rocks is more than 500 feet; it is least in the northern and central parts of the state, where crystalline rocks are near the surface.

There is a close relationship between ground and surface water resources. Ground water in storage is constantly being diminished by flow to streams and lakes and by pumpage, and replenished from precipitation. About one-fifth to one-third of the precipitation reaches the water table to replenish the ground water, and the remainder runs off to surface water courses or is lost by evaporation. At least 27,000 cubic feet per second of ground water seeps out to Wisconsin's streams and maintains their base flows. During an average year 5-6 cubic miles of ground water leave the state as base flow.

This relatively steady and natural release of ground water represents an annual change in total storage of only 0.5 percent. About 2-2.5 feet of water level change would accompany this release.

Although Wisconsin's ground water resources are substantial, development has been small in comparison to the potential. Ground water withdrawals in 1970 were about 3 percent of the natural ground water release to streams.

In 1970 ground water withdrawals in Wisconsin were estimated to be 473 mgd (million gallons per day). Of this

amount, approximately 200 mgd were used for public supplies, 129 mgd for rural use, 110 mgd for self-supplied industrial use, and 33 mgd for irrigation.

Ground water is the principal source of supply for most municipalities and farms in Wisconsin; however, large municipalities near Lake Michigan depend on surface water. In recent years there has been a growing demand for ground water to be used for irrigation.

For years most ground water investigations were conducted by the University of Wisconsin-Extension, Geological and Natural History Survey (WG&NHS), but in 1945 the Legislature authorized a cooperative agreement with the U.S. Geological Survey (USGS) to undertake studies of the ground water in the state. The Wisconsin Geological and Natural History Survey and U.S. Geological Survey continue to maintain this strong cooperative and coordinated water resources program that has provided the bulk of ground water information available in the state for the past 27 years. Both agencies also work closely with the Department of Natural Resources (DNR), which has the responsibility of insuring that wells are properly constructed and maintained to guard against pollution, and of controlling installation of wells of high capacity.

Through the Wisconsin Geological and Natural History Survey and U.S. Geological study program, information has been obtained (1) on the subsurface rocks, (2) on the fluctuations of ground water levels throughout the state, (3) on the occurrence and availability of ground water in specific areas, (4) on the relationship of ground water to surface water, and (5) on present and future effects of ground water withdrawal on the water system.

Additional work has been done by the Department of Natural Resources and the Southeastern Wisconsin Regional Planning Commission, both in cooperation with the USGS, have conducted special studies concerning ground water management and the relations of ground water to surface water. The Department of Natural Resources' studies have contributed statewide knowledge of the base flow of streams (ground water discharge), special facts on the effects of irrigation pumpage on streamflow in the central sand plain, and ground water occurrence and quality.

Fundamental studies on ground water have been conducted over the years by a number of units with the University of Wisconsin such as the departments of Civil and Environmental Engineering, Geology and Geophysics, Geography and Water Resources Management Program.

## *Problems*

In urban areas such as Fond du Lac and Milwaukee, where wells in the deep sandstone aquifer are closely spaced and are pumped at high rates of withdrawal, water levels may be lowered locally as much as several hundred feet. In such areas of excessive water level declines, proper well spacing will alleviate the problem. Southeastern Wisconsin has the additional problem of the regional lowering of water levels in the deep sandstone aquifer due to pumpage in the Chicago area.

The state and federal standards for the improving quality of surface water and the high costs of removing pollutants from liquid waste is resulting in the rapid increase of disposal of liquid wastes on the land surface. Such disposal, in pits and through irrigation, may put new quality stress on ground water resulting in ground water pollution and eventual movement of pollutants through ground water to surface water.

Ground water is being locally polluted where fractured limestone, crystalline rock, or permeable sand and gravel have a very thin and permeable soil cover and where waste disposal is occurring in recharge areas. Problems may expand in the future if preventative steps are not taken.

Comprehensive plans, scientifically designed to insure that water needs are met at the least cost, are lacking. Traditional practices, tending toward separate development of surface and ground water resources have hampered intelligent management of the resources, particularly ground water. For example, the joint use of ground water and Lake Michigan water in eastern Wisconsin may reduce pumping, treatment, and transmission costs and produce a more dependable supply.

More quantitative information on the hydrologic characteristics of the specific aquifer, withdrawals and their effects on the system, and on the ground water relationship to surface water must be obtained in order to plan for the best use of the resource. A digital computer model study of the heavily pumped deep sandstone aquifer in southeastern Wisconsin was recently started but similar models and definition of the hydrologic system are needed in other populated areas of the state such as the Lower Fox (Wis.) River Valley.

The acquisition and compilation of accurate data on water use is presently inadequate. This information is necessary for regulation and planning purposes and is required for water budget, aquifer model and other hydrologic studies. A short term pilot program for codifying and collecting this data, financed by the U.S. Geological Survey, is ready to begin but state input will be required as the program continues.

Areas of solid and liquid waste disposal are chosen for convenience and economic reasons. Although recently enacted laws and administrative codes are designed to protect ground and surface water, inadequate hydrologic data is available to insure that the

conforming waste disposal sites are not contributing to ground water pollution.

Ground water storage and discharge maintains the flow of state streams during dry periods. Although of extreme importance, little is known of aquifer characteristics regarding this storage and release.

## *Laws*

Chapters 144, 162, 614.

## *Regulations*

NR 112, well construction and pump installation; NR 108, public wells; NR 111, water works; NR 114, operators certification.

## *What Is Being Done*

The Wisconsin Geological and Natural History Survey is charged with investigating the waters of the state which is being done in cooperation with the U.S. Geological Survey. The present program includes the statewide collection of basic hydrogeologic data and detailed hydrologic investigations in areas of present or potential water problems. The present program is outlined below.

1. Well logging and subsurface geology. A knowledge of the formations below the surface is the key to all ground water studies. To provide this, samples of rock from wells, taken at 5-foot intervals, are forwarded to the WG&NHS by well drillers. They are examined, bottled, and filed, and a log is prepared to provide a permanent record. About 8,000 samples were examined in 1970. Electric logs are obtained for further refinement of subsurface geologic information and water yield information is recorded on each log.

2. Monitoring of ground water levels, springflow, and ground water quality. There are 204 observation wells maintained throughout the state, 12 springs, and 85 water quality sites.

3. River basin studies. A statewide appraisal of the water resources of the 12 major river basins. Ground water availability, movement, and use are among the many aspects of water resources being described in a series of 12 reports.

4. An analog model of the ground water system in the Madison area, which includes pumpage and surface water effects, has been prepared in cooperation with the City of Madison and the WG&NHS. This model will simulate the real system and give the effects of various planned actions for decisions concerning water management.

5. A digital model of Madison and the Dane County area also has been prepared. Thos model will have greater flexibility in the simulation of numerous alternative plans for ground water development within the county.

6. County environmental studies. These studies will evaluate ground water hydrology, geology, and soils. The studies will be useful in the selection of sites for wells, waste disposal, industry, and other land uses.

7. Public service. The data gathered over the years by the WG&NHS, and more recently by the USGS, are valuable in providing information to municipalities, industries, well drillers, planners, and consultant engineers on water supply and management problems.

8. A digital computer model of the deep sandstone aquifer in Southeastern Wisconsin is being prepared by the U.S. Geological Survey in cooperation with the Wisconsin Geological and Natural History Survey and the Southeastern Wisconsin Regional Planning Commission. The model will simulate the heavily pumped sandstone aquifer and show the effects of any water management programs proposed for the area.

The DNR and the USGS cooperative investigations include detailed studies on the base flow of streams, the potential for improving trout streams by augmenting streamflow with ground water, improvement of ground water discharge to spring ponds, supplemental ground water supply for fish hatcheries, the effects of proposed reservoirs on ground water movement and springflow and an assessment of ground water pollution in Door County. The latter has as its purpose to determine the occurrence of water in the Niagara and deep aquifer quality of the chemical and bacteriological content of these waters, thickness of the geologic formations above the base rock and the extent of ground water availability, all of which will be used in assessing the present well construction rules.

A pilot program for codifying and acquiring water use data, financed by the U.S. Geological Survey, is in the initial stages. Water use data is necessary for water studies, management and planning.

Research has been undertaken at the University of Wisconsin on the mathematical modeling movement of ground water, and interrelationship of ground water flow systems in lake shore areas.

## *What Is Not Being Done That Should Be Done*

The state and federal governments must assume primary responsibility for meeting research needs. Fundamental studies must be undertaken to provide resource management tools necessary to avoid serious problems. Among specific research needs are studies of methods to prevent liquid and solid wastes from polluting ground water, to manage water withdrawals for most efficient use of ground water reservoirs, and to understand the movement of ground water and pollutants in dolomite and sand and gravel reservoirs.

A sound ground water management program and regional planning will need an operational understanding of the hydrogeologic system. Digital aquifer models should be constructed for all large water use areas, which will give the water resource managers the means for predicting critical time, yield, and drawdown relationships. Other models should be developed to:

(a) estimate raising of ground water levels caused by recharging an aquifer;

(b) estimate spreading and dilution of contaminants that enter aquifers;

(c) estimate evapotranspiration of ground water in areas of lakes and wetlands;

(d) predict effects of proposed ground water development in areas of present or planned expansion.

Up-to-date topographic maps are essential to conducting hydrogeologic studies. A considerable portion of the state presently is not covered by modern topographic maps and in many of the areas that are covered the maps are out of date. Hydrologic and geologic studies as well as many other environmental and resource studies and management programs will be seriously retarded if the present mapping program is not accelerated.

Basic data on ground water resources of the state are collected through programs of several state agencies. Although these data are available for research and management purposes they are not readily accessable and considerable information is either duplicated or missed because of its storage in obscure places. A common data storage and retrieval system should be established that is contributed to and used by all state agencies to assure the best use of these valuable data.

## *Recommendations*

1. Present ground water research should be broadened to examine potential ground water pollution especially the movement of pollutants in ground water, their attenuation, and relation, in relation to new methods of handling liquid and solid wastes.

2. A digital model study of principal aquifers should be made in all heavily industralized and urbanized areas of the state.

3. An accelerated topographic mapping program should be instituted. Modern mapping would be a valuable aid to ground water studies as well as many other aspects of environmental research and management.

4. A coordinated data storage and retrieval system should be established to provide a common base of information for all state agencies collecting and using ground water as well as other resource data.

# PUBLIC WATER SUPPLY

## *What Has Been Done*

A public water supply is a facility serving a city, village, county, town, town sanitary district, water utility district or any system serving ten or more homes of mixed ownership. There are at present approximately 650 water systems considered to be public supplies. Of these 25 are surface water supplies and 625 ground water supplies. The population served by each is approximately 1,515,000 and 1,570,000, respectively. Public water supplies serve 70 percent of the state's population.

The primary objective for regulating public water supplies is to provide a safe water for human consumption. Public water supplies have been regulated since 1919. In that year the legislature established Chapter 144 of the statutes which incorporated state supervision over public water supplies. Supervision was the responsibility of the State Board of Health from 1919 to enactment of Chapter 614, Laws of 1965. From the beginning and as currently practiced, state level supervision incorporates plan review of proposed systems and their improvements and sanitary investigation of the waterworks systems. Through these supervisory procedures waterborne disease has for all practical purposes been eliminated. The last case of waterborne typhoid fever traceable to a public water supply was in 1929.

To further public health control of public water supplies, the Legislature established in 1965 a mandatory certification program for superintendents and operators of public water supply systems. Statewide training courses and examination are now annually given for those seeking certification. Currently approximately 1,050 certificates have been issued.

## *Problems*

Approximately one-fourth of the public water supplies distribute a water that has undesirable properties as related to taste, odor, turbidity or chemical characteristics. Of these over 50 percent serve populations of less than 1,000 population. Financial inability is stated by many of them as the reason for not providing the necessary treatment to overcome the undesirable conditions.

There are approximately eighty small privately owned subdivision or cooperative-type public water supplies in the state. Their number is increasing annually. Most have or will ultimately experience serious deficiencies. These deficiencies include: inadequate management and operation; noncompliance with state requirements for bacteriological sampling; record keeping and operator certification; inadequate construction which does not insure an adequate quantity of safe and aesthetically acceptable water; imposition of excess costs on the customers by not being included in larger municipal systems at the time of construction, or not being constructed so they can be readily merged with larger future systems, and not offering any recourse to customers with complaints concerning rates, operation or service, since they are not utilities under the jurisdiction of the Public Service Commission. Existing state statutes do not require municipal, town or sanitary district ownership and operation.

Municipalities in economically depressed areas find it difficult, if not impossible, to finance improvements to systems to bring them up to present day standards and to replace deteriorating facilities. The economic burden of the pollution abatement program is compounding the problem by diverting any available funds at the local level. At the present time, there is no state funding program and federal aids are minimal.

Interpretation of persent statutes dictates approval of systems based on health considerations only with no grounds for consideration of future best interests. As a result, some of the systems installed are not compatible with future regional water supply systems.

Although there have been no reported cases of disease outbreaks, evidence of bacteriological contamination of water supply systems served by ground water is disturbing to the regulatory agency. There appears to be substantial justification for the mandatory disinfection of all water systems rather than just those drawing water from a surface water source. Disinfection should not be construed as a substitute for proper well construction and operating procedures.

Problems of interference between wells in adjacent communities and rural developments exist. In several areas construction of new wells is undertaken to compensate for declining water levels and disputes have arisen between utilities regarding well spacing. The statutes do not give the state the power to regionalize public water supplies or order joint systems.

Present training of waterworks operators is limited to the certification program. Certified operators need a continuing state level conducted program for understanding and solving the many and varied functions included in the day-by-day surveillance of a public water supply system. Operators from smaller communities particularly need refresher as well as advanced training. A state conducted program becomes their prime source for such instruction.

Cross connections between the public water supply and sources of supply not supervised or otherwise deleterious to the drinking water are a constant threat to the potability of the public supply.

Several areas in the state have serious ground water shortage problems due to lack of water bearing formations.

## *Laws*

All the following relate to Wisconsin Statutes.

Chapter 30. Use of beds of Great Lakes by public utilities and return of treated sewage effluent.

Chapter 60. Establishment of Sanitary Districts by Town Board or Department of Natural Resources.

Chapter 144. Basic law on state level supervision of public water supplies.

Chapter 145. Installation of house service connections and basic protection to the building water piping system.

Chapter 162. Pure drinking water for human consumption.

Chapter 196. Public Service Commission regulation of public water utilities.

Section 198.22. Creation of municipal water districts.

In addition, U.S. Public Law establishes federal control of drinking water placed on interstate carriers.

## *Regulations*

All the following relate to the Wisconsin Administrative Code.

Chapters NR 102, 103, and 104. Water Quality Standards

Chapters NR 108 and 111. General Requirements for Waterworks

Chapter NR 114. Certification of Waterworks Operators.

Chapter PSC 184 and 185. Standards for Water Public Utility Service.

Chapter H 62. Plumbing requirements as related to house service connections and building piping system.

In addition:

Environmental Protection Agency (formerly Public Health Service) Drinking Water Standards. Requirements as related to drinking water intended for use on interstate carriers.

Recommended Standards for Waterworks. Design standards prepared by the Great Lakes-Upper Mississippi River Board of State Sanitary Engineers. Used to a great extent as design criteria for Wisconsin public water supplies.

## *What Is Being Done*

The surveillance and control of public water supplies is implemented by presently engaging in the following activities.

1. Maintaining and administering a bacteriological sampling program of public water supplies based on U.S. Environmental Protection Agency sampling frequency requirements.
2. Reviewing and approving plans and specifications for the construction or improvement of waterworks facilities including treatment, purification, wells, pumps, reservoirs and mains.
3. Inspecting existing installations and conferring with operating personnel to determine if there is a need for improvements to insure an adequate quantity of continuously safe and chemically acceptable water.
4. Administering training programs and examinations for certification of waterworks operators.
5. Reviewing monthly operating reports submitted by operators and taking action as necessary.
6. Maintaining a periodic sampling program of all public supplies for chemical analysis.
7. Investigating trace metal content of raw water sources and finished drinking water.
8. Certifying to the federal government the quality of the water supply used on interstate carriers.
9. Revising NR 108 and NR 111 to provide up-to-date requirements for the design and operation of public water supplies.
10. Participating in the Great Lakes Basin Commission planning study.

## *What Is Not Being Done That Should Be Done & Recommendations*

1. Though there is a program for persons seeking certification, there remains the need for advance type seminars, conferences or short courses for operators already certified. Budgetary authority to expand on this program is needed.
2. Section 144.07, Statutes, should be amended to grant power to the Department of Natural Resources to order joint or regional public water supply systems as considered needed in the interest of efficient and economical water supply development and use. Implementation of area wide water supply planning and the institutional arrangements to carry out the plan would need to be included in the statutory authority.
3. A state funding system should be established to assist waterworks which can justify the need for improvements but cannot finance the improvements with reasonable water rates.
4. To insure that customers on small privately owned subdivision type water systems are more reliably provided adequate quantities of safe and acceptable water, the statutes should be amended to require municipal ownership and operation of these systems.

# PRIVATE WATER SUPPLY

## *What Has Been Done*

In 1935, the Legislature established the Pure Drinking Water Law. It provided for the registration of well drillers and enactment of regulations governing the construction of wells and installation of pumps for water supplies not classed as public. It also authorized general supervision and control of all methods of obtaining ground water for human consumption and charged the Board of Health with the responsibility to do and perform any act deemed necessary for the safeguarding of public health. The responsibility for administration of this law is presently that of the Department of Natural Resources. Control over private water supplies was further advanced in 1953 by the statutory amendment requiring that pump installers also be registered. There are an estimated one-half million wells in this state.

In 1945, the Legislature enacted the High Capacity Well Law requiring an owner to obtain prior approval from the State Board of Health for any proposed new well construction or reconstruction or pump installation where the planned installation alone or in combination with any or all other wells on the property would have a pumping capability of 100,000 gallons per day, which amounts to 70 gallons per minute in common pumping rate terminology. The agency that has the responsibility for administering this law presently is the Department of Natural Resources.

Many and varied services have been given to citizens and agencies alike in the accomplishment of pure drinking water for those relying upon other than public water supply utilities. Thousands of Grade "A" milk producing farm water supplies have been evaluated using as the basic requirement the Wisconsin Well Construction and Pump Installation Code. The Public Health Service accepted installations not meeting new well construction requirements providing the installations were acceptable to the Board of Health as complying with the minimum requirements of the well code. Without such evaluations, hundreds of farmers would have had to replace their old wells to comply with the Pasteurized Milk Ordinance of the Public Health Service. Presently these evaluations continue under the Department of Natural Resources. Similar services of evaluation have been given countless numbers of homeowners, industries, commercial establishments, State Highway Commission, local level of governments and federal agencies.

A Manual of Well Construction, A Safe Water Supply pamphlet, and other single copy illustrations of acceptable pump installations and related information have been provided for general distribution. Such material has been invaluable in preventing violations of the Well Construction and Pump Installation Code. Several copies of this material are distributed weekly to the general public.

Informational and instructional seminars have been conducted since 1950 for 500 to 600 dairy fieldmen to discuss water supply requirements acceptable to the Public Health Service.

Guidelines have been prepared for use by dairy fieldmen and inspectors as well as supervisory agency personnel and Department personnel in evaluating existing older water supplies to effect uniformity and accuracy. Such evaluations were made possible by Section NR 112.15, Wisconsin Administrative Code, which governs existing installations.

About 175 wells have been designed by the Section for the State Department of Transportation, formerly Highway Commission, for water supplies at highway waysides and comfort areas.

Hundreds of wells have been evaluated for the purpose of solving water quality problems, including bacterial and chemical problems and also functional problems involving turbidity, inadequate capacities or faulty design.

Special surveys have been conducted to determine sources of pollution of ground water. Through education, persuasion and regulation enforcement, thousands of abandoned wells have been properly sealed, frost pits and subsurface pumprooms eliminated and new frost free accessory pumping equipment innovated.

Thousands of well construction reports containing among other items the geological information at the sites have been reviewed for code compliance and filed, adding to the state's total knowledge of ground water history. In keeping with statutory requirements, the high capacity well proposals have been evaluated and some 2,470 permits issued since 1945.

Prior to the Pure Drinking Water program, in excess of 60 percent of private water supply samples annually analyzed by the State Laboratory of Hygiene were termed unsafe. Today, this percentage is approximately 17 percent. Actually, this percentage should be lower because there are repeat samples from the same wells, there are samples that are improperly collected and possibly contaminated during collection, and because there are many samples from newly constructed wells where the well itself has not been thoroughly disinfected and conditioned for use.

## *Problems*

There are administrative difficulties because of the inadequacy of the Pure Drinking Water Law. The department has suggested amendments to this law which would provide for greater effectiveness in supervision of the private water supply program. Provisions should be placed in the proposed amendment for the licensing of constructors of driven point wells. The least control on well construction in the state involves the driven point well because of the exemption from the

need of having registered persons construct such wells.

The High Capacity Well Law is still being occasionally ignored 25 years after its enactment. The present law requires the owners to obtain high capacity well approvals when necessary and drillers indicate that it is not their responsibility to see that it is done. A test case has not been initiated to determine the responsibility of the driller. Continued difficulty is experienced in obtaining pumpage and water level information, the reporting of which are made conditions of the well approval.

In some areas of the state, nitrate concentrations in drinking water exceed the recommended U.S.P.H.S. standard considered potentially hazardous to infants. Data are lacking showing whether nitrate concentrations are increasing, primarily because there has not been a monitoring program in the past. Studies in this area need to be continued.

Gasoline and related petroleum products often are alleged to be the cause of well water pollution. Laboratory methods currently available prevent positive conclusion as to the nature of the pollutant, particularly as to the question of petroleum.

Ground water in areas of the state where creviced limestone is at or near the surface may cause a public health hazard, particularly when wells in these areas are not adequately cased to seal off the vertical zone of contamination. In several areas of the state, it has been necessary to inform drillers through special written instructions that greater depths of protective casing than normally required are necessary in constructing wells.

## *Laws*

Chapter 162, Wis. Stats. The Pure Drinking Water Law pursuant to which the private water supply program is established.

Section 144.025(2)(e), Wis. Stats. The high capacity well law.

## *Regulations*

Chapter NR 112, Wis. Adm. Code. The Wisconsin Well Construction and Pump Installation Code.

## *What Is Being Done*

Well drillers and pump installers are registered annually, new applicants' credentials are reviewed and applicants are registered when permitted by the statutes. Drilling and pump installations are spot-checked in the field.

Evaluations of water supplies continue for certification to HUD (FHA), for Grade A milk suppliers and for shell egg and poultry processing plants operating under the USDA jurisdiction.

Inspections and consultations are conducted in the field for assistance with problem wells in response to requests from well owners or well constructors. Other inspections are conducted for enforcement reasons. They are based on complaints or initiated by the Department. Special surveys are made where area problems indicate the necessity to determine the adequacy of code requirements with view that possibly special construction conditions may be needed. Such special study is currently underway in Door County. Several other special surveys are conducted for the purpose of delineating polluted water zones and determining the source of pollution if possible. Other surveys are conducted to determine the potential hazard of ground water pollution due to some planned waste disposal practice.

Accessory pumping equipment designs are reviewed for possible Department of Natural Resources approval for use in the state.

Special service is given the State Highway Division in design of all wells constructed at waysides and comfort areas.

Considerable time is given to the review of well drillers' construction reports as a means of determining as well as to acquire compliance with the code.

Applications for approval of high capacity wells and school water supplies are reviewed for approval and a permit issued when conditions of the statutes are met.

## *What Is Not Being Done That Should Be Done*

1. Improved control over construction of driven point wells is highly desirable. This can be brought about by requiring licensing of driven point well constructors.

2. Licensing of rig operators working for licensed well drillers and helpers working for registered pump installers should be required.

3. Authority for establishing minimum experience and training requirements should be provided for pump installers and examinations should be required for both new well drillers and pump installers. The term "permit" should be changed to "license" in all categories regulated by the statutes.

4. Though drainage wells are prohibited by section NR 112.12, Wis. Adm. Code, a considerable number of such wells are believed to exist in certain marsh locations. The Department should initiate a program to locate and require sealing of drainage wells.

5. More field checking into the drilling and pump installing operations in addition to spot-checking of pump installations is necessary.

6. There is little activity at the municipal level to accomplish the permanent abandonment and proper sealing of wells when water main extensions are made. Presently, the only active municipalities in this pro-

gram are those in the Milwaukee-Wauwatosa and surrounding area.

7. There is a need for more aquifer performance tests to obtain aquifer characteristics throughout the state. It is planned to set up a team for this purpose, including hydrogeologist being added to the Department staff.

## *Recommendations*

1. Amend statutes to require licensing of driven point well constructors.

2. Amend statutes to require licensing of drilling rig operators (helpers) and pump installation helpers.

3. Amend statutes to require minimum experience requirement for pump installer applicants and examinations for applicants for both new well driller and pump installer licenses.

4. Amend the statutes to change the word "permit" to "license" whenever it occurs.

5. Establish a program of locating and sealing marshland drainage wells.

6. Effect a program of proper well abandonment in municipalities having public water supply systems.

7. Reintroduce Senate Bill 357 (1971) in the 1973 Legislative session with further amendment to require licensing of constructors of driven point wells.

8. Develop a program of continuing studies, including monitoring of nitrates in ground water.

# SOIL ABSORPTION OF LIQUID WASTES

## *What Has Been Done*

Though crude soil absorption observations were performed as early as the 1930's, it was not until 1956 that the state regulated the procedure for determining the liquid absorptive capacity of soils. Site and test requirements were refined and expanded in 1968 as related to subdivisions and in 1969 totally to all soil absorption installations.

In 1963, the plumbing law was made applicable statewide. Since then only licensed plumbers may install private domestic sewage disposal systems. The 1965 Water Resources Act established county sanitary codes resulting in a greatly expanded supervision over soil percolation tests. This 1965 act also established the state septic tank permit which now gives an annual accounting of locations where systems are being installed.

The Upper Great Lakes Regional Commission funded in 1971 a small scale waste management project with assistance and additional funding by the University of Wisconsin. Purpose of the project is to demonstrate innovative solutions to disposal of liquid wastes in problem soils. The project has been extended and is currently continuing.

In recognition of the major problem that is the disposal of liquid wastes in problem soils, the 1971 Legislature appropriated $200,000 to the College of Agricultural and Life Sciences, University of Wisconsin, to conduct special research on developing low-cost sewage disposal systems for problem soils that will meet the required standards of state regulatory agencies. This action accomplished recommendation number 4 of the 1971 edition of *Quality Management For Wisconsin.*

The 1971 Legislature also established that Wisconsin shall have a statewide uniform plumbing code. Since regulations on private domestic sewage treatment and disposal systems are contained in the state plumbing code there is now one single set of regulations rather than the variable number of county supplemental ordinances that existed prior to March 15, 1972.

Wisconsin has taken a nation wide leadership role in this major problem to public health and the environment. A report, *Regulations for Disposal of Rural Domestic Liquid Wastes in Wisconsin,* an inland lake renewal and shoreland management demonstration project of the Upper Great Lakes Regional Commission concludes as follows:

"A comparison of Wisconsin statutory regulations and administrative code provisions regulating liquid wastes disposal reveals that the state is a leader among the states. Nevertheless, studies and new regulations, based upon sound supporting data, are needed to promote the most appropriate waste disposal techniques."

That Wisconsin is seeking "sound supporting data" is evident.

## *Problems*

There are seven fundamental problems. 1) The considerable presence in the state of soils, ground water, bedrock or land slope unsuitable for soil absorbing liquid. Every county in the state has problem soils that will not support individual septic systems to meet the present criteria of the state code. Some soils are too "tight" to accept liquid wastes, other locations have shallow soils over rock while the sandy areas have the hazard of ground water pollution. Public attention has been particularly directed to Door County, northwestern red clay area and to the poorly drained southeastern Wisconsin. 2) Insufficiency of expertise in the conduct of percolation tests and physical evaluation of soils. 3) Use of new soil absorption systems in high density land occupancy. Basic data is not available to conclude that large soil absorption systems will function satisfactorily. 4) The disregard by certain county officials of technical facts that specific sites will fail to absorb liquids; but nevertheless they are granting "variances" to permit installation of such systems. 5) The desires of local officials, land developers and land owners to pressure state agencies into acceptance of alternate methods of disposal for which there are no factual studies to prove the claims of the manufacturer. 6) Continued desire of local governments to permit new construction in floodplains. 7) Poor performance in the application of percolation tests.

As this research has progressed throughout the state and as citizens have examined their management of waste disposal systems, it is clear that Wisconsin faces critical waste management problems which demand innovative solutions. Dealing with the questions of problem soils will require added years of research. Other related problems also demand immediate attention. Questions are being raised throughout the state in particular about the manner of disposal of sludges in soils, the protection of the public against dangers of virus, the protection against ground water contamination, etc.

## *Laws*

All the following relate to Wisconsin Statutes.

Chapter 145. State plumbing law. Provides that soil absorption system must be installed by licensed plumber. Establishes power to regulate the systems. Establishes that the regulations shall be uniform statewide, in short, preempts the regulations to state level.

Section 144.025(2)(q). Department of Natural Resources may prohibit installation or use of a private waste disposal system or systems in any area of the state. Must recommend alternate method.

Section 144.03. State septic tank permit law.

Section 144.26(6). Navigable waters law. Department of Natural Resources must provide recommended standards to assure proper operation of liquid waste systems near such water.

Sections 236.13(1)(d), 236.13(2m) and 140.05(7). Establishes state health agency responsibility in subdivisions not served by a public sewer.

Sections 60.30 - 60.316. Town sanitary district law.

Section 59.07(51). County sanitary code enabling act.

Section 146.14(2). Mandatory action by townships as related to malfunctioning liquid waste systems.

Section 30.71(1) and (2). Authority of state health agency to regulate on-shore disposal of boat toilet wastes.

## *Regulations*

Section H 62.20, Wisconsin Administrative Code. Establishes uniform statewide requirements for all private domestic sewage treatment and disposal systems.

Chapter H 65, Wisconsin Administrative Code. Establishes lot size and elevation for all subdivisions not served by public sewers.

County Sanitary Ordinances. Incorporate county sanitary permit system for installation of liquid waste disposal systems in accord with the state uniform code.

## *What Is Being Done*

Plan approval is required of private domestic sewage treatment and disposal systems for locations serving the public. Percolation test, bore hole and related site information must be made known for review and approval. Field checks are made when the data needs to be substantiated. If approval is not granted, the owner may request approval for a holding tank.

In 71 counties the county sanitary ordinances require the owner to secure a permit to install a liquid waste disposal system. These are issued upon conclusion that soil tests and site factors are satisfactory.

State personnel respond to consultation requests as work load permits. State level field checking is performed at all proposed mobile home parks and camps of 75 housing sites or more for which soil absorption is planned. Approval is denied if ground water pollution is expected.

The University of Wisconsin Extension coordinates training of licensees performing soil tests and county officials supervising the ordinance. To a limited degree state health agency staff supplements training.

Subdivisions not served by public sewers are cleared by the state health agency if all requirements of Chapter H 65 are satisfied even though land use density may cause ground water pollution. Field checks are conducted when necessary to clarify data. Field review is made at most subdivisions bordering navigable water. Soil Conservation Service soil scientists are frequently used for morphological study of the site.

A research program was initiated after the Legislature approved the state budget in November 1971. During the first year, research has been in the laboratory and at fifteen test demonstration sites throughout the state.

## *What Is Not Being Done That Should Be Done*

There is extremely minimal application of Section 146.14(2), Wis. Stats. Prime reason is the inability to correct a malfunctioning soil absorption system in the presence of totally unacceptable soil, ground water or bedrock conditions, slope or insufficient site area. In these instances the only solution is hauling the sewage to an acceptable disposal site or if urbanization and economics permit, installation of public sewerage. It is known that individuals will not cause the hauling of the liquid waste at a frequency necessary to prevent overflow of the septic or holding tank. It is too costly. Should local government provide this service as a tax supported program for control of the environment?

There has been no direct application of Section 144.025 (2)(q), Wis. Stats. The prime reason is the lack of being able to offer "alternate methods" that are both workable and economical. In many respects this statute is indirectly accomplished through promotion and establishment of sanitary districts formed for the purpose of constructing public sewers and contracting with a core city for sewage treatment, or for construction of a complete sewerage system. Section 144.025 (2)(q), is an unused law and needs study.

There is inadequate on going training and consultation services at state level on private domestic sewage treatment and disposal problems. State staff should be provided to respond specifically to these areas of need.

As urbanization of the rural areas increases, the use of soil absorption systems presents real concern to protection of the ground water resource. Chapter 236, Statutes, does not permit the state health agency to object to an unsewered subdivision on the basis of its potential pollution of the gound water. The law should allow the agency to object to an unsewered subdivision of high land use density.

If this major problem to public health and the environment is to be solved, the local governments must uniformly cease to grant variance for new construction at sites that cannot support soil absorption of the wastes, including sites in flood plains.

There is need for tighter control over the individual authorized to conduct percolation tests and soil evaluations. Many are now attempting to give this service who are uninformed or otherwise careless in following established procedural methods.

## *Recommendations*

1. A special ad hoc committee should be appointed within NRCSA to consider the problem of inadequate soil absorption systems and to determine what needs to be done to fully enforce existing laws and what new legislation or new techniques should be devised to meet the problem.

2. A study be conducted to determine the criteria for limiting the volume of liquid waste discharged to the subsoil at any one site.

3. The state health agency be staffed with technicians funded by user fees to provide consultation on private domestic sewage treatment and disposal systems and for training of persons installing and officials regulating such systems.

4. All counties uniformly cease to issue sanitary permits for installation of soil absorption systems for new properties that are located in floodplains.

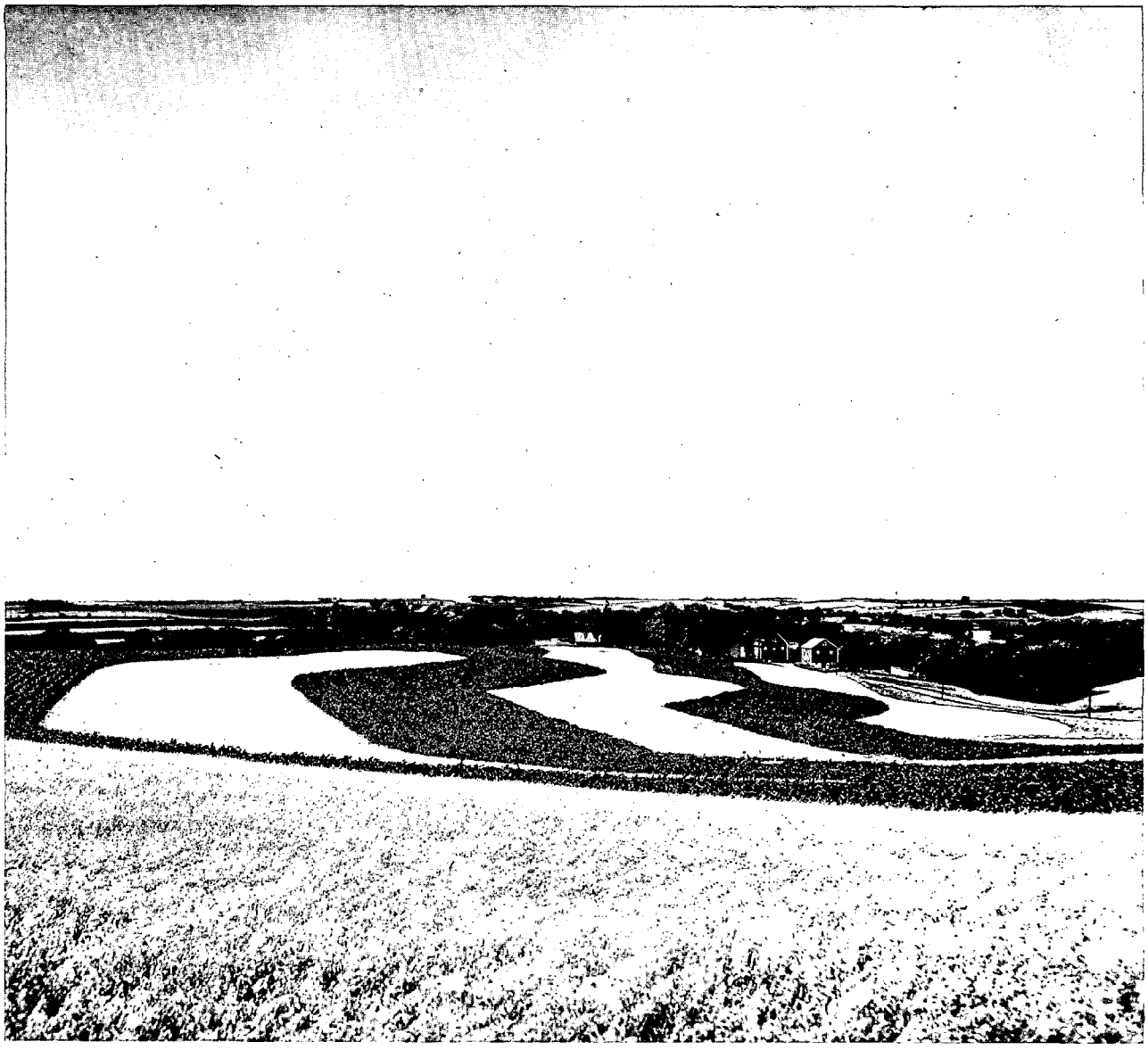
5. Local officials cease to grant variances for new properties for which soil test findings show inability to absorb liquid wastes.

6. Legislation be enacted to establish certification of soil testers by examination.

7. Legislation be enacted requiring any municipal sewage treatment plant that has received state aid for its construction to accept hauled domestic sewage and for which a nominal fee may be charged.

8. There be appropriated to the University of Wisconsin College of Agricultural and Life Sciences, sufficient funds for continuing research into the development of low cost sewage disposal systems in problem soils that will meet the required standards of state regulatory agencies.

# THE LAND RESOURCE



*"I say you can't sell land . . . you might just as well sell the wind, and water, and sky. Land belongs to all the people . . . the only thing you can sell is what you can carry away!"*

*Black Hawk - 1832*

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# STATE LAND RESOURCES CONCERNS

## *What Has Been Done*

In these times of heightened environmental concern, the wise use of valuable and finite land resources takes on a special significance. Land use is the point of interface between man and his natural and man-made environment. It is through his use of land that man makes his most direct and lasting impact on the quality of his living environment.

Yet, today, there is evidence of exploitive, wasteful and unwise use of our land resources and the destruction of unique ecological and recreational assets. Wetlands are drained. Prime agricultural lands are converted to subdivisions. Electric transmission lines mar the countyside. Old city residential and commercial centers deteriorate into slums. Some zoning practices tend to reinforce social polarization. Urban sprawl compounds the high cost of public services.

The fundamental importance of land use to the quality of man's life and the need to responsibly guide the use of land has only recently come to be fully recognized.

During the last century, land was seen not as a resource, but rather as a commodity to be freely exchanged and used in a laissez-faire economy. Its use and abuse was a matter to be determined exclusively by the owner. Public policy dictated primarily that the land be used and developed in an effort to foster state and national growth.

As our national focus began to shift from rural to urban, citizens learned that the crush of city life could bring about a decline in the quality of living. During the 1920's, states enacted enabling laws permitting local governments to regulate land use. But the impetus was primarily to protect property values, not to preserve important resources. And, in enacting zoning laws, the states delegated their inherent authority to plan and guide land use to hundreds of autonomous local governments. This legislation introduced the desirability of doing planning in advance of taking action on land use and other resource matters. It was based on assumptions that:

1. The owner of land is the initial decider of its use. The owner has power to use and develop his land as he wishes except as specifically restricted by state or local legislation.

2. The public interest of the state lies in authorizing local governments to control development decisions of landowners within the boundaries of local government.

3. The state enables local action; it does not mandate local planning for land management nor does it maintain a quality review of local plans or of the conformity of actual development to such plans.

4. The purposes toward which local action may be directed are the full inventory of constitutionally permissable purposes of government action—promotion of health, safety, morals and general welfare.

In the early 1920's Wisconsin adopted most of the U.S. Department of Commerce's standard enabling act for local planning and zoning. "Local action" may take the form of establishing plan commissions, preparing master plans, adopting zoning ordinances, controlling land subdivision practices, reserving sites for future streets, parks, and parkways to prevent inconsistent development and adopting all manner of building, housing, and health codes. Furthermore, local units of government may encourage or accommodate such phenomena as cluster development or planned unit development, employ floating zoning or overlay regulation, establish conservancy districts, exclusive use zones or use other modern techniques.

Subdivision regulation laws were totally revamped in the mid-1950's. The new subdivision statute provided that significant land divisions would be subject to multiple layers of review. However, state agencies review is limited to narrowly circumscribed aspects of plat design. In addition, there are reviews by as many local units as have jurisdiction over the parcel. However, the subdivision review field is the only area of land use regulation in which state agencies regulary become informed of pending use changes.

While Wisconsin has adhered generally to the national norm in its system of localized land use policy, it has pioneered in several respects. Our courts have rendered several important decisions generally supportive of land use regulation. In 1923 the State Supreme Court upheld a municipal zoning ordinance saying that individual rights and the inherent rights deriving from ownership of land could constitutionally be subordinated to the rights of society, *(State ex rel. Carter Harper 182 Wis. 148 (1923)).* This major decision predated the classic 1926 United States Supreme Court case of *Euclid v. Ambler, 272 U.S. 365,* upholding zoning. The Wisconsin Supreme Court has also upheld the validity of official map regulations *(State ex rel. Miller v. Manders, 2 Wis. 2nd 265, (1957));* extraterritorial zoning by cities and villages *(Walworth County v. Elkhorn 27 Wis. 2nd 30, (1965));* requirements of land dedications by subdividers *(Jordan v. Village of Menomonee Falls, 28 Wis. 2nd 608 (1966);* and shoreland zoning *(Just v. Marinette County (1972) 56 Wis. 2nd 7.*

Wisconsin's pioneering Outdoor Recreation Act Program, first enacted in 1966 and then substantially expanded in 1969, was a national forerunner for a number of similar acts passed by the federal and other state governments. In the ensuing decade thousands of additional acres of important recreational assets have been acquired and preserved, new parks have been developed, wildlife habitat has been preserved, new lakes have been created, and scenic easements have been acquired.

With the enactment of the Water Resources Act, (c. 614, Laws of 1965) Wisconsin led the nation in instituting new means to protect flood plains and shorelines. That act authorized the state to set standards for flood plain and shoreline zoning and required local governments to meet these standards. Since then all counties have enacted minimum shoreland zoning ordinances, and flood plain ordinances have been adopted by 40 counties and 106 municipalities.

Prior to 1971 Wisconsin's state revenue sharing statutes acted to encourage tax base competitiveness and to create tax islands, with consequent deleterious effects on sound land use management. The system encouraged local officials–when faced with a decision of whether to permit economically expedient development in prime resource areas–to make the economic choice that would temporarily increase the local tax base. The 1971 budget act thoroughly revamped the state revenue sharing system, and significantly lessened the incentives for local officials to make unsound land use decisions. The long-range effects of this new revenue sharing system cannot be evaluated for several more years, but it promises to be a positive incentive toward important land resources preservation.

## *Problems*

Wisconsin's system for land use planning and management has not resolved a number of significant problems, including the development of adequate means to:

1. Control the damage that is being done to important and irreplaceable historic, cultural and environmental assets; (e.g., wetlands destruction, major historic sites, unique scientific and aesthetic resources, etc.).

2. Preserve the land resources upon which important segments of the state's economy is based; (e.g., prime agricultural lands, forestry resources, mineral resources, etc.).

3. Objectively evaluate the broad public interest in deciding upon large scale public and private developments that have physical, social and economic effects throughout a region; (e.g., major artificial lake developments, recreational subdivisions, major shopping centers, new freeways, etc.).

4. Objectively evaluate the broad public interest in deciding upon regionally beneficial developments and land uses; (e.g., low and moderate income housing, preservation of key open spaces, solid waste disposal sites, etc.).

5. Control the devastating environmental and economic effects of leapfrogging urban sprawl.

Other problems include:

1. A land use decision system that is highly decentralized, delegating authority to hundreds of autonomous local governments, with little specific capability to avoid parochial decisions that adversely affect the regional interests.

2. A state taxation system that is too often out of step with desirable land use goals. Property taxes which force premature conversion of agricultural lands on the urban periphery is but one example.

3. A federal taxation system–with its capital gains provisions, and deductions for property taxes and interest–that permit tax shelters for land speculation purposes.

4. A land use management system that primarily relies upon the use of the public police powers to prevent the most damaging developments, but does not use positive means to encourage the best forms of development.

5. Inadequacy of state review of subdivision plats because of narrowness of scope under ch. 236, and because of insufficient time (20 days) and personnel for review, and complexity of review process because of the muntiplicity of governments reviewing plats.

## *Laws*

1. Local government zoning enabling powers: Sections 59.97, 60.74, 61.35, and 62.23, Wisconsin Statutes.

2. State and regional planning enabling powers: Sections 16.95 and 66.945, Wisconsin Statutes.

3. Flood plain-shoreland zoning powers: Sections 87.30 and 59.971, Wisconsin Statutes.

4. Subdivision control powers: Chapter 236, Wisconsin Statutes.

5. Official map enabling powers: Section 62.23, Wisconsin Statutes.

6. Eminent domain powers: Chapter 32 and Sections 23.09 and 27.05, Wisconsin Statutes.

7. Airport and airport protection powers: Sections 114.135 and 114.136, Wisconsin Statutes.

8. Soil and water conservation district land use powers: Section 92.08(4), Wisconsin Statutes.

## *Regulations*

1. Wisconsin flood plain-shoreland management programs: Chapter NR 116 and NR 115, Wisconsin Administrative Code.

2. Subdivisions not served by public sewer: Chapter H 65, Wisconsin Administrative Code.

3. Land subdivision plats abutting state trunk highways and connecting streets: Chapter Hy. 33, Wisconsin Administrative Code.

## *What Is Being Done*

In July 1971, the Governor created the Wisconsin Land Resources Committee, charging it with the task of identifying land use problems of statewide significance and proposing methods "by which the state can influence and direct land use decisions, especially where significant statewide environmental and urban development

concerns are involved." The Committee has completed its study and will shortly issue its final report.

The recommendations of the Land Resources Committee is divided into several principal areas: identification of those critical land resources and land uses that have statewide or regional importance; development of a comprehensive land use information system; strengthened land use planning at all levels of government; and, state involvement in the regulation of certain endangered lands and developments with areawide effects. Legislation to carry out the LRC recommendations is being prepared, and will be considered by the 1973 Legislature.

The Governor has directed the Department of Local Affairs and Development to thoroughly study needed revisions in state laws related to multi-jurisdictional planning in Wisconsin. This study is intended to thoroughly evaluate the desirable future role of regional planning agencies and propose legislation.

Court decisions could largely determine the scope of the means by which the state can influence and direct land use decisions. For example, in August 1972, the Wisconsin Supreme Court upheld the constitutionality of the state shoreland zoning program, Sections 87.30 and 59.971, Wisconsin Statutes, as not being a constructive taking of land without compensation. The Court stated the following legal concept: "an owner of land has no absolute and unlimited right to change the essential natural character of his land so as to use it for a purpose for which it was unsuited in its natural state and which injures the rights of others" *(Just v. Marinette County 56 Wisconsin 7 (1972).*

Some of the many land use information gaps are being addressed. A program to accelerate the preparation of soil surveys has been set forth by State Soil and Water Conservation Board. In conjunction with the University of Wisconsin, the Department of Administration and other state agencies have embarked on a critical resources information program (CRIP) to develop an adequate information base to guide critical land resources areas. The same group is also designing a statewide, geographic based, land use information system as a coordinated method to interrelate the various data needed for sound land use planning.

Congress recently enacted the Coastal Zone Management Act, and is now actively considering the enactment of a National Land Use Policy and Planning Act. Both bills require states to become involved in guiding critical land uses, and provides funding to encourage comprehensive land use planning.

The level of property taxation, as well as its specific impact in administration, has distorting effects on sound land use patterns. Both through federal revenue sharing and the proposed state property tax relief program, the total amount of property taxes levied in Wisconsin will be significantly lowered. This should have the desirable effect of helping to neutralize the disincentives of high property taxes toward desirable land use patterns.

## *What Is Not Being Done That Should Be Done*

Information on many natural resources is inadequate. Emphasis should be directed toward the development and analysis of resource information as the critical factual base for making decision on resource and land use planning and management.

Local land regulatory systems, established under enabling laws enacted 50 years ago and incrementally developed since that time, need to be modernized and streamlined.

New capabilities for local, regional and state agencies to encourage desirable development through the public purchase should be studied and authorized. Governmental disposition should be coupled with contractual conditions much stronger than can be achieved through police power standards.

A full evaluation should be made of the combined effects of all taxation policies on the use of land, and a thorough evaluation should be made of alternative methods to alleviate the deleterious effects and provide positive incentives toward desired land use goals.

## *Recommendations*

1. Support of expanded effort to gather, develop, and analyze facts on Wisconsin's natural resources as an essential basis for making wise decisions on resource and land use policy, planning and management.

2. A basic system for regulating significant statewide and regional land resource concerns (identified under problems section) should be established. This system should incorporate:
a. A centralized state land planning agency to provide the statewide direction-setting and coordinative land planning functions needed to guide the state's land planning responsibilities.
b. State standards, set by statute and formal administrative state action to guide decisions on significant statewide concerns.

*Continued on page 66*

## *Recommendations* –*Continued*

c. A state capability to make final land use decisions and order implementation.

3. The state should be empowered to directly regulate a limited number of statutorily specified land uses with opportunity for local input to the state's decision.

4. The capability and authority of regional planning agencies to plan and regulate regionally significant land uses should be established by statute.

5. The state should study innovative measures that will more specifically define land uses that are compatible with current and future statewide land resource policies. Specifically, it should carefully consider:
(a.) Establishing major program of public purchase and controlled disposition of key metropolitan lands for private development;
(b.) Possible amendment of the constitutional uniform taxation clause to allow greater legislative flexibility in coordinating taxation policies with land use policies;
(c.) Modifying present property tax laws to reflect use-value assessment instead of potential value assessment; and
(d.) Designing system of regionwide sharing of property tax base growth to relieve local tax base competition and facilitate better land use patterns.

6. The state should prepare a "State Land Use Policy Report" biennially to advise the Governor and Legislature of land use trends, problems and priorities, a suggested action program, and proposed land resources policies.

7. The 20 to 30 day limitation on state review of subdivision plats should be lengthened to be made consistent with the requirements of sec. 1.11, stats. (Wisconsin Environmental Policy Act), and funding should be provided for adequate staff for plat review. Procedures should be developed for simplifying the review process and eliminating excess duplication of subdivision plat reviews.

# FLOODPLAIN - SHORELAND MANAGEMENT

## *What Has Been Done*

As of December 1971, all applicable Wisconsin counties have enacted minimum *shoreland* zoning sanitary and land subdivision ordinances and have employed a staff to administer the regulations. By the end of fiscal 1971-72, *flood plain* ordinances had been adopted by 40 counties and 106 cities and villages; of 90 municipalities issuing enforcement orders in 1971, 57 had adopted ordinances officially approved as complying with state and federal standards for flood plain management, 28 had adopted some form of regulations and 5 were delinquent of extensions issued and had made little or no progress toward adoption of a flood plain ordinance. Of the total 462 communities where a need for flood plain zoning exists, 106 have adopted ordinances, 20 are working on regulations, 15 have requested a flood plain information study, and 321 have taken no action at all. Ultimately all local flood plain regulations must meet or exceed minimum standards in the Wisconsin Administrative Code–Chapter NR 116, Flood Plain Management Standards.

The Corps of Engineers, U.S. Geological Survey and the Soil Conservation Service have programs to assist Wisconsin communities in flood plain delineation. About four delineation studies by the federal agencies are done each year. Many counties in Southwest Wisconsin (the unglaciated portion of the state) have adopted ordinances based on detailed soil maps.

Training sessions to educate Zoning Administrators, Board of Adjustments, and Plan and Zoning Committees are conducted frequently. Educational materials have been prepared. District offices participate in flood data collection efforts including aerial photography.

About 100 potential flood plain or shoreland projects are annually reviewed for compliance with state flood plain-shoreland standards. These reviews include projects requiring plan approval such as sewage treatment plants and projects involving federal funds such as F.H.A. mortgage applications for public housing. All subdivision plats are reviewed for compliance with Chapters NR 115 and 116, Wisconsin Administrative Code. Notice of and decisions on special exceptions, amendments, and variances of local regulations are also reviewed by the Department of Natural Resources.

The Department also has the responsibility to coordinate the National Flood Insurance Act in Wisconsin and act as a liaison between the local units of government and the U.S. Department of Housing and Urban Development. The local units of government must adopt flood plain regulations meeting state standards before the citizens of a community are eligible to obtain flood insurance at federally subsidized rates. The Department conducts meetings, and prepares newsletters and educational materials on the federal program. As of September 1972, 71 Wisconsin communities are eligible for the Federal Flood Insurance Program.

## *Problems*

1. There is a statewide lack of flood data, topographic base maps, and technical assistance which are needed for flood plain delineation.

2. Lack of coverage of the State of Wisconsin with the 7½ minute series of U.S.G.S. topographic quadrangles hampers local land use control mapping programs.

3. A need exists to train the county and municipal zoning administrators, planning and zoning committees, and board of appeals, so that they can operate more effectively.

4. Portions of Sections 59.971 and 87.30 of the Wisconsin Statutes dealing with flood plain and shoreland zoning are not clear or need upgrading.

## *Laws*

The shoreland zoning requirements are to be found in Sections 59.971 and 144.26; the flood plain requirements in Section 87.30 of the statutes; Flood Insurance under the National Flood Insurance Act of 1968. If the local units of government do not adopt adequate regulations, the state is empowered to adopt the same.

## *Regulations*

The program is administered through local ordinances. The state's responsibility is to see that acceptable ordinances are enacted. The procedure governing state operations is to be found in Wisconsin Administrative Code NR 115, "Shoreland Management" and NR 116, "Flood Plain Management". The authority for review of federally financed projects is Presidential Executive Order 11296, "Federal Register", Volume 31, 155–Thursday, August 11, 1966.

## *What Is Being Done*

The counties and municipalities are being assisted by the Department in preparing local ordinances to comply with the law. Informational meetings and enforcement conferences are continuously being conducted. Madison office functions are in the process of being decentralized to enable more field contacts with local officials.

## *What Is Not Being Done That Should Be Done*

1. Adopted county shoreland ordinances are generally based on a model state ordinance reflecting minimum state standards. These ordinances should, where applicable, be amended to include special controls over areas that are unique or require special considerations within a particular county. For example, different lot sizes and building set backs may be appropriate in undeveloped areas as compared to areas of existing high

density use. Special ordinance provisions may be necessary to protect or control such things as areas of unique environmental, scenic or historical qualities, wetlands, vegetative cover, and potential sources of pollution from road building, pesticides, manuring practices and commercial fertilizers, disposal of storm water runoff, areas of bluff and streambank sloughing and sources of soil erosion, etc.

2. Identification or inventory of prime wetland areas where special controls are needed.

3. Acceleration of the U.S.G.S. topographic mapping program of the state for flood plain mapping and identification of wetlands, unique areas, etc.

4. Aerial surveillance and field inspections of zoned areas to determine the effectiveness of administration and enforcement of local regulations.

5. Flood plain construction provisions should be developed to be included in local building codes and rules of the Department of Industry, Labor and Human Relations.

6. Effective administration of state required land use controls is expensive yet funds are not made available by the state.

7. The effectiveness of the administration and enforcement of any land use controls are only as good as the public understanding of the purpose and objectives of such controls. There is a lack of public informational programs.

## *Recommendations*

1. Consolidate and simplify Sections 59.971 and 87.30 of the Wisconsin Statutes.

2. Appropriate funds to expand the current flood plain inundation studies.

3. Accelerate the U.S.G.S. topographic mapping.

4. Request the appropriate agencies to proceed with the development of building code provisions to guide construction in flood prone areas where construction is not contrary to zoning provisions.

5. Encourage local ordinances to require the dedication by subdividers of suitable units of shoreland for public uses.

6. The reinstatement of the grants-in-aid program for complying local governmental units is essential to provide for more effective administration of land use controls.

7. Conduct public educational programs before controls are adopted.

8. Assign higher priorities to various state and federal open space funds for acquiring or controlling by easement lands under the most restrictive regulations where little or no economic private use is permitted.

9. Require cities and villages that are rural in nature to adopt shoreland regulations similar to county requirements.

10. Require shoreland and flood plain regulations to be applicable to nonnavigable waters where such nonnavigable lakes and streams require protection as determined in accordance with predescribed performance standards.

11. Require state or municipal owned facilities (buildings, streets, sewer, water, etc.) to conform to same standards adopted locally. Lack of such legislation is a major deterrent in the implementation of the Wisconsin Flood Plain-Shoreland Program.

12. Taxation adjustments are needed for private lands affected by severe land use controls where, in particular, the courts could construe such controls as a taking of land without due compensation. Such legislation is paramount over any needs for successful environmental controls over land use.

# WETLAND CONSERVATION

## *What Has Been Done*

Wetlands are defined as land areas with shallow surface waters and/or water-logged soils during at least part of the growing season. Historically, wetlands have been regarded by most segments of society as wastelands, yielding a low economic return. The historic conversion of wetlands to income-producing uses by draining or filling has ignored a complex of public values. Wetland conversion attempts continue; though the current rate of annual loss, on a statewide basis, no longer exceeds one percent. Somewhat less than half of the original 5 million acres of wetlands in Wisconsin remain, with greatest losses in the south and east.

Wetlands support a variety of water tolerant plants, ranging from those growing under the water, through floating plants, emergent aquatics, sedges, grasses, shrubs, up to trees. Among the contributions of wetlands to society recognized today are: 1) tying up nutrients which would otherwise contribute to the eutrophication of lakes and streams; 2) temporary storage of flood waters and reduction of sedimentation; 3) provision of suitable habitat for a wide variety of native plants and animals (many animals spend their entire existence in wetlands while others rely on them only seasonally for breeding and shelter); and 4) contribute toward stabilization of stream flows, lake levels, and ground water tables. Wetlands are of particular value in areas of high human density, because they provide needed open space, diversity of landscape and unique opportunities for recreation, education and scientific research.

The 1850 Swamp Land Act granted to public domain states full title to all lands in swamp or subject to overflow. Eventually the 3-1/3 million acres so patented to Wisconsin largely became private lands. In the 1900's various levels of government have bought back and are continuing to purchase selected wetlands in Wisconsin. The Department of Natural Resources (Conservation Department) initiated an active program of wetland acquisition and restoration with the purchase of the first parcel of land on Horicon Marsh in 1930. Since then a total of almost 276,000 acres of wetlands have been purchased by DNR. Approximately 17 percent of 383,000 acres of county forest land is classed as wetland, with almost one-third consisting of lowland brush.

Federal forests in Wisconsin contain another 216,000 acres of wetland. The three national wildlife refuges contain approximately 166,000 acres of wetlands but 150,000 acres of this is along the Mississippi River, with some in Minnesota, and much of it the result of artificial levels established by the Corps of Engineers as an aid to navigation. Approximately 20,000 acres of additional wetlands are protected within the Central Wisconsin Conservation Area and under DNR long-term leases. A total of 911,000 acres of wetlands are therefore protected by some form of public ownership. Approximately 1,600,000 acres of wetlands remain in private ownership.

Wisconsin's flood plain and shoreland management programs afford some measure of wetland protection through the use of land use controls enacted by local units of government. All counties have adopted shoreland regulations including zoning, sanitary and subdivision controls. One hundred forty four units of local government have adopted acceptable flood plain zoning ordinances.

The Wisconsin Supreme Court recently decided a landmark decision upholding the state's shoreland zoning program against a constitutional attack in a test case arising in Marinette County. *Just v. Marinette County,* October 31, 1972. Speaking for a unanimous court, Chief Justice Hallows' opinion started out with the recognition that the basic purpose of the Marinette County shoreland zoning ordinance is "to protect navigable waters and the public rights therein from the degradation and deterioration which results from uncontrolled use and development of shoreland." Hallows went on to characterize the constitutional challenge as "a conflict between the public interest in stopping the despoilation of natural resources, which our citizens until recently have taken as inevitable and for granted, and an owner's asserted right to use his property as he wishes." The court went on to state that "this case causes us to reexamine the concepts of public benefit in contrast to public harm and the scope of an owner's right to use of his property. In the instant case we have a restriction on the use of a citizen's property, not to secure a benefit for the public, but to prevent a harm from the change in the natural character of the citizen's property,".... his land so as to use it for a purpose for which it was unsuited in its natural state and which injures the rights of others. The exercise of the police power in zoning must be reasonable and we think it is not an unreasonable exercise of that power to prevent harm to public right by limiting the use of private property to its natural uses." The court further held that "the changing of wetlands and swamps to the damage of the general public by upsetting the natural environment and the natural relationship is not a reasonable use of that land which is protected from police power regulation.... nothing this court has said or held in prior cases indicates that destroying the natural character of a swamp or wetland so as to make that location available for human habitation is a reasonable use of that land when the new use, although of a more economical value to the owner, causes a harm to the general public."

This decision was based in a large part on the public trust doctrine: "We start with the premise that lakes and rivers in their natural state are unpolluted and the pollution which now exists is man-made. The State of Wisconsin under the trust doctrine has a duty to eradicate the present pollution and to prevent further pollution in its navigable waters....respect to navigable

waters requires the state not only to promote navigation but also to protect and preserve those waters for fishing, recreation, and scenic beauty." Thus the court found that the Wisconsin Legislature, in authorizing shoreland zoning, and Marinette County in adopting its ordinance, was carrying out the public trust duty to prevent pollution and protect the waters of the state from degradation through valid police power enactments.

The court refused to follow decisions in other states which had struck down zoning regulations involving flood plains and wetlands as being unconstitutional taking of private property, stating that:

"While some of these cases may be distinguished on their facts, it is doubtful whether these differences go to the basic rationale which permeates the decision that an owner has a right to use his property in any way and for any purpose he sees fit." Commenting on those decisions, the court states that: "It seems to us that filling of swamp not otherwise commercially usable is not in and of itself an existing use, which is prevented, but rather is the preparation for some future use which is not indigenous to a swamp. Too much stress is laid on the right of an owner to change commercially valueless land when that change does damage to the rights of the public." The court responded to the property owner's argument that their property had been severely depreciated in value by stating that: "...But this depreciation of value is not based on the use of the land in its natural state but on what the land would be worth if it could be filled and used for the location of a dwelling. While loss of value is to be considered in determining whether a restriction is a constructive taking, value based upon changing the character of the land at the expense of harm to public rights is not an essential factor or uncontrolling."

The court recognized the fact that under the Marinette County shoreland zoning ordinance, which was patterned after a state promulgated model ordinance, and which meets minimum standards set forth in sec. NR 115, Wis. Adm. Code, some changes in wetlands were permitted to a limited extent: "Changes in filling to some extent are permitted because the extent of such changes and filling does not cause harm....This is not a case of an isolated swamp unrelated to a navigable lake or stream, the change of which would cause no harm to public rights." By this language, the court seems to be interpreting both the Marinette County ordinance and the state law as prohibiting changes or filling in wetlands adjacent to or near navigable waters which would result in harm to the public right under the public trust doctrine. Thus this decision may have the effect of prohibiting uses in wetlands that are inconsistent with the public trust rights. Even if the *Just* opinion in and of itself does not constitute such a prohibition, the way is clearly pointed for DNR to exercise its authority under sec. 144.26 and 59.971 in prohibiting uses inconsistent with the public trust on a statewide basis.

Various U.S. Department of Agriculture programs affect wetlands in Wisconsin. The Water Bank Program, implemented on a pilot project basis in Dodge, Fond du Lac and Winnebago Counties in 1972, protects eligible wetlands by providing annual payments under a 10-year agreement which precludes drainage, filling, cropping or grazing. Neither cost-sharing nor technical assistance is provided any longer by USDA for the drainage of three types of wetlands that contain surface waters during most of the growing season. Cost-sharing for surface drains and tiling under the Rural Environmental Assistance Program, is also limited to 30 percent of cost and restricted to lands that have been cropped or seeded for hay or pasture in two of the last five years. A total of 42 Wisconsin counties offered the surface drain practice in 1972 and 21 of these same counties offered tiling.

The earliest and, to date, the most complete statewide survey and classification of wetlands was done as a part of the Wisconsin Land Use Inventory conducted in the 1930's. This was administered by the Wisconsin Department of Agriculture under the supervision of Dr. John Bordner.

A more recent inventory of wetlands is available for 15 counties in southeastern Wisconsin. This survey was done by Department of Natural Resources' personnel between 1954 and 1960, except for Ozaukee County, which was surveyed in 1968.

An inventory of wetlands over 50 acres in size within the Fox and Milwaukee River watersheds was done in the late 1960's by DNR personnel under contract to the Southeastern Regional Planning Commission. Sheboygan County wetlands were inventoried in 1970 as part of a broader resource inventory.

## *Problems*

Private landowners continue to drain or fill wetland in an effort to increase income. For many farmers, increased acreages of cropland mean greater efficiency and the increased acreage can often be obtained more economically by draining wetlands than by purchasing adjacent uplands. In real estate development, increased profit can often be obtained by filling or converting wetlands into a private lake to enhance sales of the remaining property. The major problem is that in converting wetlands for private gain, a complex of public values is sacrificed.

The following are more specific problems in the wetland conservation area:

1. Price support and indirectly, cropland diversion, programs of USDA affect wetland drainage. If perfectly competitive farm prices prevailed and uplands were not withdrawn from production, there would currently be less incentive to invest in wetland drainage.

2. Rising property taxes force conversion of wetlands. As taxes rise, private landowners can no longer afford the luxury of owning property that is not producing income on a regular basis. Farmers near urban areas who want to expand invest in wetland drainage as opposed to acquiring uplands at subdivision prices.

3. Currently there are nine active watersheds in eastern Wisconsin with feasibility or preliminary investigation reports that propose a total of 98 miles of stream channelization under PL-566. Wetlands are still relatively abundant in these watersheds and the flat terrain will facilitate private drainage if improved outlets for tile and surface drains are provided.

4. Many remaining wetlands have been degraded in the past by surface ditches, while others continue to be degraded by excessive siltation or water level fluctuations caused by surrounding land uses.

5. Where land values are high, pressures exist to amend flood plain and shoreland zoning ordinances which protect some wetlands. Flood plain delineation and technical assistance to county zoning administrators is also limited by lack of funds.

6. Funding for the federal water bank program is currently very limited and the program does not include all types of wetlands.

7. The Department of Natural Resources has certain regulatory authority over wetland conversions associated with navigable waters, but none on wetlands that are not associated with navigable waters.

8. The state drainage law, Chapter 88 of the Wisconsin Statutes, does not cover private wetland drainage by single or consenting landowners acting in concert. Chapter 30.19 of the Wisconsin Statutes exempts development for agricultural purposes.

9. There is local resistance to large scale wetland acquisition by the Department of Natural Resources because of loss of tax base. Maintenance costs also become excessive with extensive state ownership.

10. Wetland maps and inventories for many counties are currently out of date.

## *Laws*

None that relate specifically to wetland surveys or conservation.

Chapter 88 of the Wisconsin Statutes provides for organized drainage districts.

Shoreland Zoning–Sections 59.971 and 144.26.

Flood Plain Requirements–Section 87.30

Sections 30.19, 30.195 and 30.70 provide for enlargement of waterways, straightening of navigable rivers and streams and dredging from the beds of navigable waterways.

Section 36.28, Wisconsin Statutes, assigns responsibility of mapping the soils of the state to the Wisconsin Geological and Natural History Survey to ascertain the extent and practicability of draining of swamp and wetlands of the state.

ORAP-200.

## *Regulations*

Wis. Adm. Codes NR 115 and NR 116, Shoreland and Flood Plain Zoning.

Wis. Adm. Code NR 151, Solid Wastes.

## *What Is Being Done*

The Department of Natural Resources is continuing to purchase wetlands at the rate of 8,000 acres per year under ORAP-200. The primary thrust of this program, however, is toward meeting long-term management needs and demands for public hunting and fishing areas.

Progress continues on the adoption of local land use controls under Wisconsin's flood plain and shoreland management programs.

The Federal Water Bank Program will be offered in Dodge, Fond du Lac and Winnebago Counties in 1973. Approximately $65,000 is available to fund new contracts in Wisconsin.

## *What Is Not Being Done That Should Be Done*

1. Strengthen local flood plain-shoreland management programs and regional planning efforts by providing more technical data and training for local officials. Improve recognition of the broader public values in wetlands and limit private development rights by zoning or the adoption of other land use regulations.

2. Review existing drainage, flood control and water regulation laws which pertain to navigable waters and strengthen the ability to protect wetlands. Extend protective authority to nonnavigable waters.

3. Adopt new legislation regulating the alteration of wetlands by requiring a permit from DNR. Wetland development permits could be granted, subject to conditions necessary to preserve the wetland environment, or permits may be denied. If permits were denied, the state could contribute toward local property taxes on the protected wetland.

4. Amend property tax laws to include a wetland tax relief program similar to the Forest Crop tax law or adopt legislation permitting taxation of wetlands on the basis of its undeveloped value (with a roll-back tax), rather than its highest and best value as normally assessed.

5. Establish and fund a program to update wetland maps and inventories, including an accelerated topographic and soil mapping of the state.

6. Conduct research relative to wetland values and functions that will establish more precise criteria for decision making.

## *Recommendations*

1. New legislation regulating alteration of wetlands by requiring a permit, with the state contributing toward local property taxes, under certain conditions, should be adopted and funded.

2. Strengthen laws pertaining to wetlands associated with navigable waters and extend protective authority to nonnavigable waters.

3. Incorporate protection of broad public values in wetlands by adopting comprehensive land use regulations.

4. Accelerate flood plain delineation and provide additional training for local enforcement officials.

5. Establish a program to update wetland maps and inventories to strengthen regulation of wetland alterations including an accelerated topographic and soil mapping of the state.

6. Initiate necessary wetland research and multi-agency development of a rating system which will reflect public values and interest in the conservation of specific wetlands.

7. Support legislation, legal action or constitutional amendment which would permit the assessment of wetland on the basis of its undeveloped value (with a roll-back tax), rather than on its highest and best value as currently assessed.

8. The Department of Natural Resources complete the comprehensive planning of all shorelands pursuant to sec. 144.26 of the statutes as a highest priority item.

# SOIL CONSERVATION

## *What Has Been Done*

The history of soil conservation efforts in Wisconsin can be traced back to about 1885 with the establishment of the first strip cropping patterns to control erosion by August Kramer, an immigrant from Germany, in Mormon Coulee, La Crosse County. This was a rare instance. It was not until O.R. Zeasman, an extension specialist with the University of Wisconsin, took on the task of working with the farmers in the southwestern part of the state, that formal efforts by the government were undertaken to correct problems of erosion. This began in 1922, and resulted in some of the first structural measures for erosion control such as sediment control dams, drop inlets and diversion terraces.

The Wisconsin Geological and Natural History Survey has had an active soil survey program since 1897 which provided much of the basic information necessary to early soil conservation practices.

Formal research into the problem of soil erosion began with the establishment of the La Crosse Experiment Station in 1931, which served for more than 30 years as the Upper Mississippi Erosion Experiment Station.

Erosion control work received its big impetus with the establishment of the Civilian Conservation Corps in 1933. Nine Corps Camps were established by 1934 to work on erosion control. Most of the CCC Camp's efforts were directed toward structural measures although eventually efforts were extended in the area of strip cropping, terraces and other measures.

In 1937, full national efforts were given to soil conservation. That year the federal government, by special letter from the President to each Governor, requested states to assume leadership and responsibility for the organization and servicing of soil conservation districts of their states. Thus, Chapter 92 of the Wisconsin Statutes evolved which provided for a soil conservation committee (now the Board of Soil and Water Conservation Districts) and eventual creation of 72 county Soil and Water Conservation Districts along county boundary lines.

The U.S. Soil Conservation Service, a federal agency of the U.S. Department of Agriculture, was established in 1935 to provide technical assistance through the districts to the landowners.

The Extension Service was given the responsibility by the U.S. Department of Agriculture for the educational efforts in soil and water conservation and the Agriculture Adjustment Administration (now the Agricultural Stabilization and Conservation Service) began in 1937 as an agency to provide cost-sharing to the landowners for the installation of soil conservation practices.

The major efforts in the Soil and Water Conservation District Program can best be measured in terms of accomplishments on the land practices. The basic objective by which districts operated for the first 30 years revolved around "using the land according to its capabilities". Service to the farm business community became the focal point of attention during this time and the final goal of every landowner was to have a basic conservation plan for his land and water resources. This goal is partially met as is shown by the following statistics:

Major Accomplishments on the Land Practices 1937–1971 by District Cooperators in the State of Wisconsin

| Item | 1937 | 1962 | 1971 |
|---|---|---|---|
| No. of District Cooperators | 0 | 41,041 | 50,664 (9,846,807 ac.) |
| No. of Basic Conservation Plans | 0 | 27,670 | 35,604 (6,138,166 ac.) |
| Soil Surveys | ? | 15,052,499 ac. | 21,253,945 ac. |
| Contour Strip Cropping | ? | 1,069,013 ac. | 1,300,309 ac. |
| Terraces | 0 | 3,885 mi.* | 2,907 mi. |
| Diversions | 0 | 2,370 mi. | 2,920 mi. |
| Tile Drains | ? | 6,520 mi. | 13,779 mi. |
| Pasture and Hayland Renovation | 0 | 349,815 ac. | 904,861 ac. |
| Tree Planting | ? | 151,251 ac. | 586,157 ac. |
| Wildlife & Wetland Development | ? | 18,006 ac. | 365,206 ac. |
| No. of Farm Ponds | ? | 1,861 | 11,032 |

*In 1962, included broad base terraces.

**PL 566 Watershed Programs.** The second large impetus for accelerating the soil and water conservation district program began with the passage of Public Law 566, the Small Watershed Protection and Flood Prevention Act of 1954. While aimed primarily at flood control and agricultural water management, the primary measure of this program is accelerated land treatment.

As of January 1, 1972, the Board of Soil and Water Conservation Districts has approved 56 applications for planning assistance on watershed projects. Ten projects have been completed with an additional 11 projects under construction. These 21 watershed projects cover approximately 978,000 acres. In addition, nine applications have been approved for federal planning and an additional 11 applications have been approved by the State Board of Soil and Water Conservation Districts. These 20 applications cover approximately 1,450,000 acres. Since 1962, studies to determine the feasibility of watershed projects have been made on 44 areas. These studies recommended that 13 areas not pursue an application because of time and effort required for preparation and for project investigations and planning. Twelve areas which represent approximately 690,000 acres are feasible and applications are being prepared.

Of the 35 million acres of the state, 2.5 million acres are covered by watershed projects in advance stages of planning and/or construction.

Of the projects completed it has been determined that on an average, approximately 80 percent of the land area has been adequately treated with upland conservation practices. Approximately, 20 million dollars has been invested in these projects to date.

An important side effect of the watershed program was the creation of artificial lakes for recreation purposes under PL-566. The federal funds combined with state ORAP funds, formerly administered by the Board of Soil and Water Conservation Districts (now by the Department of Natural Resources), and local funds resulted in the creation of 11 lakes with a total of over 950 acres of water and 7,000 acres of surrounding parkland by 1969. These lakes provide almost 300,000 visitor days of use per year. All are located in western and southwestern Wisconsin, which is almost devoid of lakes for recreational purposes.

As a result of the impetus placed on a group effort in watershed planning, many areas that appear to be not feasible through Public Law 566, have taken upon themselves to organize as watershed associations complete with constitution and bylaws. Approximately 50 watershed associations are working without PL-566 assistance in Wisconsin.

Furthermore, the Agricultural Stabilization and Conservation Service has long recognized the fruits of unified group planning for land treatment measures. Through organized and active watershed associations they have allocated approximately $75,000 to $100,000 annually for additional projects. This amount is over and above the allocations given annually to each county.

**Soil and Water Conservation District Programs.** Chapter 323, Laws of 1971 updates Chapter 92, Wis. Stats., the enabling legislation for Soil and Water Conservation Districts. Chapter 323 changes the structure of the "Board of Soil and Water Conservation Districts" and broadens the responsibilities of Soil and Water Conservation Districts.

The area of total concern in soil and water conservation programs has been broadened. Each district shall prepare a long-range program, inventory natural resources, prepare an annual plan of work and an annual report of activities. Districts may now work with incorporated municipalities upon request; districts may own land, facilities and equipment and operate same. The district shall annually prepare and approve a budget for its operation and services to be submitted to the County Board. Tax monies raised for the district program by the County Board shall be forwarded to the district to administer.

Land use regulations, as a district conservation "tool", were made more functional for districts. Now land use regulations which affect soil and water, erosion, flooding or sedimentation can be formulated by the district for land use within the district but outside of incorporated villages and cities. After due process of hearings, the County Board may enact such ordinance provided it is approved by a simple majority of the eligible electors residing in the area to be affected and who vote on the referendum.

Chapter 511, the state cost sharing program between the Board of Soil and Water Conservation Districts and the districts has been financially "doubled". Now each district may receive through approved requests at least $2,000 annually for conservation projects. The scope of projects has been broadened to include technical and nontechnical services; materials necessary in the planning and application of conservation measures; field equipment and educational measures. Past records note that many districts have made excellent use of this financial cost sharing assistance.

From July 1966 to July 1972, the Board of Soil and Water Conservation Districts was granted a state appropriation of $72,000 annually. These monies have been used to cost share on a 50-50 basis with Districts for approved conservation projects. With approximately $397,500 of state funds utilized during this period, the Districts completed conservation projects costing a total of $1,360,000. As of July 1972, the state allocation has been increased to $144,000 annually. This increase in financial aid will allow districts to carry on more effective programs and achieve a greater return for the state's investment.

As a result of Chapter 323, Laws of 1971, the Board of Soil and Water Conservation Districts with statutory responsibilities in land and water resources is again represented on the Natural Resources Council of State Agencies.

The enactment of this legislation was a milestone achievement in the "soil and water district law".

Efforts put forth by the districts resulted in obtaining a $100,000 state appropriation for research on low cost sewage disposal systems for problem soils. This research is presently underway under the direction of the School of Natural Resources, College of Agricultural and Life Sciences, University of Wisconsin. These funds have been combined with a grant from the Upper Great Lakes Regional Commission to University of Wisconsin–Extension. The current program is able to integrate research and extension resulting in a rapid dissemination of findings and results. State and federal agencies participate in the work by means of a policy committee.

**Soil Survey**. Soil surveys are soils maps of the soil resources and soil interpretations. Properly used, they provide a basis for sound land use decisions. The Soil Survey now being conducted is part of the national cooperative soil survey being made by the U.S. Department of Agriculture Soil Conservation Service in cooperation with the State Agricultural Experiment Station, the University of Wisconsin and other cooperating agencies. The soil survey is the first step in developing a basic conservation plan with a landowner. The Survey is a tool that can be used by land use planners, including planning and zoning agencies, engineers, architects, foresters, industrialists, recreation specialists and developers.

Approximately 45 percent of the state remains to be mapped, including much of the northern half of the state. Most of the published soil surveys are for counties in Southwestern Wisconsin and Southern Wisconsin. Soil surveys will be made on about one million acres in 1972.

## *Problems*

The soil and water conservation program which includes the unified approach of watershed programs is extended to landowners on a voluntary basis. Services to these landowners are given upon request. In watershed programs, the planning and implementation for solving soil and water problems is done in a manner to include the entire area. Education, technical assistance and cost of sharing incentives are used to encourage the district's programs.

Under this system as well as in the total district program of application of land treatment measures, the planning is done in direct consultation with the landowner or occupier. They are included in every step of the planning processes which in turn has excellent results in implementation.

In completed watershed projects eighty percent of the total area is adequately treated with conservation land treatment measures.

Seemingly, the incentives for reaching the landowners of the remaining twenty percent of the land are inadequate.

Utilization of the district's land use regulations by county board ordinances is an approach which can be used. Under this system, all landowners would have an obligation to protect his land with land treatment measures and every square foot of land would be covered by planning and implementation programs. Since all landowners would be included, the district's program would not be susceptible to being incomplete or weak because one or more land owners were not following sound land and water related conservation practices.

However, it must be realized that under this type of regulations there will remain, some landowners who will do the absolute minimum required versus those that voluntarily implement a total plan.

Cities and villages are not required to utilize Chapter 92. However, they can upon request to the District reach the objectives of the "soil and water conservation district law" to the maximum extent possible. No separation would then exist in planning and implementation efforts between rural and urban areas.

Soil and water programs for a city or village would not be done independently but would be contiguous to the overall district planning and implementation process. Otherwise the district's program could be undermined if, for example, control of sedimentation from construction projects in a city or village was not an essential, directly integrated element of the total district's program.

The past emphasis, for implementing conservation practices, has been the losses and damages occuring on the property of origin. Knowledge of associated problems stemming from soil erosion has vastly increased. The deposition of sediment in watercourses degrades water quality which results in environmental damage. Pesticides and fertilizers tend to attach themselves to soil particles thus contributing to potential pollution of our lakes and streams as soil or sediment is moved onto the hydrologic system. Soil erosion then becomes a problem to other people and a major concern to all.

The kind and extent of problems needing project action can be noted in the table.

WATERSHED PROJECTS INVENTORY - 1967

INVENTORY OF POTENTIALLY FEASIBLE WATERSHEDS LESS THAN 400 SQUARE MILES IN AREA WITH THE KINDS AND EXTENT OF PROBLEMS NEEDING PROJECT ACTION

| MAJOR DRAINAGE AREA, PRINCIPAL DRAINAGE BASIN, SUBBASINS | WATERSHEDS FEASIBLE FOR PROJECT ACTION | | KIND AND EXTENT OF PROBLEMS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FLOOD PREVENTION | | | AGRICULTURAL WATER MANAGEMENT | | | NONAGRICULTURAL WATER MANAGEMENT | | | |
| | | | FLOODWATER AND SEDIMENT DAMAGE | | | | | | | | | |
| | | | AGRICULTURAL | URBAN | EROSION DAMAGE | DRAINAGE | IRRIGATION | RURAL WATER SUPPLY | MUNICIPAL OR INDUSTRIAL WATER SUPPLY | RECREATIONAL DEVELOPMENT | FISH & WILDLIFE DEVELOPMENT | WATER QUALITY MANAGEMENT |
| | No. | Acres | Acres | Acres | Acres | Acres | Acres | No. | No. | No. | No. | No. |
| Great Lakes - St. Lawrence | | | | | | | | | | | | |
| Lake Michigan - 5 | 23 | 2,062,411 | 28,300 | 1,490 | 3,885 | 102,780 | 6 | 4 | 6 | 23 | 21 | 20 |
| Lake Michigan - 5G | 8 | 503,708 | 6,690 | 3,130 | 1,145 | 22,270 | 0 | 0 | 3 | 6 | 6 | 3 |
| Lake Michigan - 5H | 14 | 1,169,291 | 10,304 | 1,400 | 5,932 | 58,930 | 0 | 0 | 3 | 13 | 13 | 5 |
| Lake Michigan - 5H1 | 2 | 139,293 | 3,000 | 100 | 4,754 | 8,000 | 0 | 0 | 0 | 2 | 2 | 0 |
| Lake Michigan - 5H2 | 8 | 934,763 | 7,059 | 2,000 | 17,002 | 139,600 | 0 | 2 | 2 | 7 | 6 | 3 |
| Lake Michigan - 5I | 1 | 230,686 | 0 | 100 | 0 | 9,000 | 0 | 0 | 0 | 1 | 1 | 1 |
| Lake Michigan - 5J | 1 | 199,950 | 5,000 | 30 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| Lake Michigan - 5K | 2 | 170,661 | 170 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 2 |
| Lake Michigan TOTAL | 59 | 5,410,763 | 60,523 | 8,250 | 32,718 | 340,580 | 6 | 6 | 15 | 55 | 52 | 35 |
| Lake Superior - 6 | 1 | 208,074 | 0 | 0 | 720 | 1,000 | 0 | 0 | 0 | 1 | 1 | 1 |
| Lake Superior - 6C | 1 | 154,867 | 700 | 40 | 7 | 10 | 0 | 0 | 0 | 1 | 1 | 0 |
| Lake Superior TOTAL | 2 | 362,941 | 700 | 40 | 727 | 1,010 | 0 | 0 | 0 | 2 | 2 | 1 |
| Great Lakes - St. Lawrence TOTAL | 61 | 5,773,704 | 61,223 | 8,290 | 33,445 | 341,590 | 6 | 6 | 15 | 57 | 54 | 36 |
| Upper Mississippi | | | | | | | | | | | | |
| Black River - 14 | 9 | 1,090,717 | 5,840 | 625 | 3,077 | 54,460 | 0 | 0 | 3 | 7 | 8 | 3 |
| Black River Basin TOTAL | 9 | 1,090,717 | 5,840 | 625 | 3,077 | 54,460 | 0 | 0 | 3 | 7 | 8 | 3 |
| Chippewa River - 11 | 11 | 1,025,833 | 11,318 | 842 | 8,470 | 14,562 | 300 | 0 | 1 | 10 | 11 | 7 |
| Chippewa River - 11B | 2 | 235,588 | 5,040 | 23 | 6,200 | 3,300 | 0 | 0 | 0 | 2 | 2 | 2 |
| Chippewa River - 11C | 5 | 445,966 | 19,170 | 1,250 | 8,855 | 3,000 | 0 | 0 | 0 | 5 | 5 | 3 |
| Chippewa River Basin TOTAL | 18 | 1,707,387 | 35,528 | 2,115 | 23,525 | 20,862 | 300 | 0 | 1 | 17 | 18 | 12 |
| Illinois River - 28A2 | 2 | 91,354 | 62,500 | 0 | 0 | 4,500 | 0 | 0 | 0 | 2 | 1 | 1 |
| Illinois River - 28B | 2 | 253,681 | 2,927 | 400 | 0 | 11,200 | 0 | 0 | 0 | 2 | 2 | 1 |
| Illinois River Basin TOTAL | 4 | 345,035 | 65,427 | 400 | 0 | 15,700 | 0 | 0 | 0 | 4 | 3 | 2 |
| Mississippi River | 25 | 1,895,630 | 50,517 | 1,925 | 110,470 | 18,200 | 0 | 2 | 3 | 16 | 15 | 2 |
| Mississippi River Basin TOTAL | 25 | 1,895,630 | 50,517 | 1,925 | 110,470 | 18,200 | 0 | 2 | 3 | 16 | 15 | 2 |
| Rock River - 21 | 19 | 1,613,955 | 41,541 | 2,848 | 2,709 | 59,820 | 0 | 1 | 6 | 15 | 17 | 13 |
| Rock River - 21A | 4 | 487,144 | 18,651 | 120 | 70 | 38,100 | 0 | 0 | 2 | 4 | 4 | 4 |
| Rock River - 21B | 10 | 544,848 | 14,388 | 230 | 15,857 | 1,700 | 0 | 0 | 2 | 9 | 10 | 6 |
| Rock River - 21B1 | 4 | 509,190 | 23,379 | 400 | 3,680 | 15,850 | 0 | 0 | 3 | 4 | 4 | 4 |
| Rock River Basin TOTAL | 37 | 3,055,137 | 97,959 | 3,598 | 22,316 | 115,470 | 0 | 1 | 13 | 32 | 35 | 27 |
| St. Croix River - 9 | 7 | 976,519 | 7,000 | 226 | 5,146 | 10,220 | 0 | 0 | 0 | 7 | 7 | 6 |
| St. Croix River Basin TOTAL | 7 | 976,519 | 7,000 | 226 | 5,146 | 10,220 | 0 | 0 | 0 | 7 | 7 | 6 |
| Trempealeau River - 13 | 3 | 407,609 | 16,160 | 1,085 | 1,750 | 6,090 | 0 | 1 | 0 | 3 | 3 | 0 |
| Trempealeau River Basin TOTAL | 3 | 407,609 | 16,160 | 1,085 | 1,750 | 6,090 | 0 | 1 | 0 | 3 | 3 | 0 |
| Wisconsin River - 17 | 33 | 3,216,431 | 68,169 | 2,725 | 24,175 | 51,508 | 0 | 2 | 8 | 31 | 31 | 21 |
| Wisconsin River - 17A | 7 | 392,711 | 13,878 | 1,436 | 7,150 | 0 | 0 | 5 | 2 | 5 | 7 | 7 |
| Wisconsin River Basin TOTAL | 40 | 3,609,142 | 82,047 | 4,161 | 31,325 | 51,508 | 0 | 7 | 10 | 36 | 38 | 28 |
| Upper Mississippi TOTAL | 143 | 13,087,176 | 360,478 | 14,135 | 197,609 | 292,510 | 300 | 11 | 30 | 122 | 127 | 80 |
| Wisconsin TOTAL | 204 | 18,860,880 | 421,701 | 22,425 | 231,054 | 634,100 | 306 | 17 | 45 | 179 | 181 | 116 |

Construction practices in urban developments are causing a serious problem from sediment production. These sediments are eventually deposited in our streams and lakes. Sediment remains as the largest pollutant by volume.

The following are more specific problems in the soil conservation area.

1. **Large fields are needed for large farming equipment, particularly the cash crop systems.** Traditional conservation practices such as grass waterways, terraces and strip cropping are no longer looked upon with favor by some large farm operators. This has created a serious problem from the wind and water erosion aspect in central and southeastern Wisconsin. It is spreading to southwestern Wisconsin.

2. **Lack of technical assistance.** The U.S. Soil Conservation Service has less staff for technical assistance available than it had 10 years ago, primarily because of federal budget reductions for ongoing programs. An unreleased report by the Service indicates a need for an additional 38 man-years of technical assistance in the soil and water conservation area. There are approximately 112,000 farms in the state who own the bulk of the land needing conservation practices. At the present time we are working with less than half of them. The single biggest problem is providing enough technical manpower to assist these landowners.

3. **Watershed programs.** The watershed inventory indicates that 211 of the 410 watersheds are potential PL-566 projects. These would provide flood protection and agricultural water management to 50% of the land area of the state. The biggest problem here is to plan watersheds for federal funding under PL-566. At the present time, only two watersheds are authorized for planning each year.

4. **Streambank erosion.** Throughout Wisconsin streambank erosion continues to be a major problem, which eventually becomes a water quality problem. Raw banks created by flood waters and by cattle grazing have destroyed a large number of trout streams and warm water fisheries. In addition, these banks become sources of sediment which eventually produce a flood hazard by reducing the storage or carrying capacity of streams.

5. **Irrigation.** There are 110,457 acres of irrigated rotation cropland in the state. Dominant problems are: (a) erosion on 13,243 acres; (b) excess water on 17,386 acres; and (c) shallowness and droughtiness on 79,828 acres.

There are 3,555 acres of orchards, vineyards and bush fruits irrigated in the state (mostly cranberry beds).

6. **Urban construction on large tracts.** As the demand increases for more homes, shopping centers and other associated facilities, it brings serious erosion problems. Developers tend to open large tracts of land at one time to maximize uses of machinery and labor. These tracts often lie open and devoid of vegetation for a year or more.

7. **Soil and Water Conservation District Supervisor Training.** District Supervisors are, by virtue of their position, members of the county boards. As a result of the election process, there is a 30-35% turnover in supervisors every two years. This creates a problem of developing continuity in programs and leadership at the local level. The staff assigned to the Board of Soil and Water Conservation Districts is hard pressed to provide the necessary training processes to keep supervisors abreast and on top of their responsibilities.

8. **Budget.** Soil and water conservation districts contribute most of their efforts to private land holdings since most of their available technical assistance is from federal or state agencies assigned that responsibility. Districts, however, are deeply involved in other projects dealing with non-private lands such as county owned land. Districts receive mostly county allocated funds for undertaking conservation projects. It is estimated that these appropriations amount to $800,000 per year.

## *Laws*

Program responsibilities: Section 15.911 (1), Wisconsin Statutes.

Power of Eminent Domain for use by "Districts": Section 32.02 (1), Wisconsin Statutes.

Approval of Board of Soil and Water Conservation Districts prior to Drainage Boards entering into contracts with U.S. Government: Section 88.22 (3), Wisconsin Statutes.

Soil and Water Conservation District Law: Chapter 92, Wisconsin Statutes.

Section 36.23 (2) and 36.28 Wisconsin Statutes, directs the Wisconsin Geological and Natural History Survey to study the soils of the state and to conduct soil surveys and construct a soils map of the state.

## *Regulations*

The provisions for regulations dealing with soil conservation are found in Section 92.09–92.12 of the statutes. These sections deal with the adoption of land use regulations at the county level.

## *What Is Being Done*

Several activities are now underway, in addition to those enumerated under "What Has Been Done."

1. An attempt by the Board of Soil and Water Conservation Districts is being made to expand its staff capabilities by budgetary action. Increases in staff to work directly with districts is a primary budget item. Secondly, funds for land easements and rights-of-way on a loan basis have been sought in the 1973-1975 budget request. Request is also being made for cost sharing on additional technical help directly with districts and also for accelerated soil surveys through districts.

2. The Board has established goals it wishes to reach by January 1973. Additional long-range goals were adopted by the Board early in 1971.

3. A District Outlook Committee composed of Board of Soil and Water Conservation Districts members and advisors and representatives of the State Association of Soil and Water Conservation Districts has been formed to continually study the needs in the area of soil conservation. Several recommendations of this committee have been incorporated into the 1973-75 budget request of the Board.

4. Teacher training in Soil Conservation: Soil and water conservation districts in cooperation with state and federal conservation agencies have been heavily involved in training teachers. They have sponsored seminars at Trees For Tomorrow, provided training in soil judging for vocational agricultural teachers and students, and have developed curriculum guides and teaching aids. In addition, many districts hold teacher training workshops and field days for school children. The Dane, Green, Columbia, and Outagamie Districts have field days for schools which attract over 7,000 students and several hundred teachers. Most districts provide exhibits, lectures and information through publications to schools, organizations and individuals. Over 100 articles a day appear on soil and water conservation programs throughout the state.

5. Watershed studies: The Board of Soil and Water Conservation Districts has been receiving an average of five requests for feasibility studies on watersheds per year. These eventually could lead into PL-566 projects. An average of 1.4 watersheds per year go into the construction stage.

An interagency biology team composed of representatives from the Department of Natural Resources, University Extension and Soil Conservation Service has been established to inventory and evaluate fish, wildlife and forestry resources.

6. River Basin Studies: The USDA planning team, composed of the Soil Conservation Service, Economic Research Service and the Forest Service is conducting a River Basin Study of the Southeast Wisconsin Rivers Basin. Coordination of the study, with all state and federal agencies and regional planning commissions, is carried out through a river basin committee established by the Natural Resources Council of State Agencies.

7. Flood Hazard Analysis and Flood Insurance Studies are conducted for the Soil and Water Conservation Districts on an average of 5 projects per year.

8. The Board of Soil and Water Conservation Districts has established a committee to prepare a model ordinance for land use regulations.

## *What Is Not Being Done That Should Be Done*

1. Watershed planning under PL-566: State supported watershed planning for PL-566 construction projects should be undertaken by the Board of Soil and Water Conservation Districts. This would greatly increase the land treatment program, expand the recreational sites in southwestern Wisconsin and increase the economy of a given watershed through flood protection and agricultural water management.

In addition, state support should be provided to accomplish geologic investigations of foundations and abutments.

2. Soil Survey: The state should, through a cost sharing arrangement with counties, establish through the Wisconsin Board of Soil and Water Conservation Districts, an accelerated soil survey mapping program. At the present rate of the survey, it will take well over 20 years to complete this task. Counties have shown that they are willing to provide financial support for this program. The SCS is agreeable to coordinate and to provide field training and supervision in conducting the survey to meet standards of the National Cooperative Soil Survey.

3. Hydrologic studies of watersheds: In conjunction with watershed studies, research should be conducted on those affected by PL-566 projects where agricultural water management is a prime feature. Conflicts are evolving between wildlife interests which allege there is a loss of wetland habitat and related values and those that claim no loss due to channelization and associated measures.

Additional fish and wildlife resource studies are needed to effectively evaluate and demonstrate potentials for development.

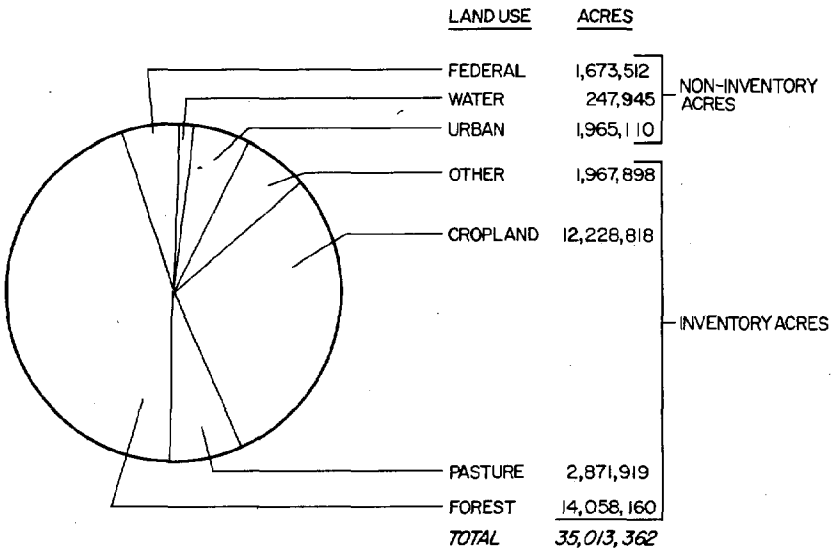
4. Continuing research on low cost sewage disposal for problem soils. Fifty percent of the land area in Wisconsin will not support septic systems to meet the present criteria of the state code. This is a soils problem throughout the state that in turn affects the quality of water and the economic growth of an area (see also Solid Waste Disposal–Agricultural; Ground Water Quantity and Quality–Soil Absorption of Liquid Wastes; Surface Water Quality–Agricultural).

5. Urban sediment control programs: To date very few local, area or state efforts are expended in any type of urban sediment control program. Formal efforts should be undertaken to enact a voluntary program or one that is compulsory through zoning ordinances or state regulations as recently enacted in Maryland.

6. Streambank protection: At the present time there is no known figure on full extent of eroded streambanks or the full impact on water quality, flood control or aesthetics. A statewide survey should be made to determine this.

7. State aids in the employment of conservation technicians: Wisconsin is one of the few states that does not provide state funds for hiring or cost sharing with districts on technicians. These are nonprofessional employees trained to lay out conservation practices which require competent supervision of installation. Those which are on the payroll at the present time are with Federal Soil Conservation Service employees or county employees. The demand for servicing more than 50,000 cooperators who have agreed to follow a conservation plan far exceeds the manpower available, to say nothing of others who could be reached. Some of the local extension offices indicate that it is inadvisable to promote soil and water conservation when there is not enough technical help to assist those who ask for it. State cost sharing with the districts is needed to increase the volume of conservation practices on the land.

8. Wisconsin's soil and water conservation needs inventory (conservation needed on the land): The following summary is from the September 1970 Conservation Need Inventory compiled by 13 state and federal agencies in cooperation with the County Soil and Water Conservation Needs Inventory Committee. The WISCONSIN LAND AREA involved in the inventory can be quickly noted in the circle graph.




### (a) Cropland

12,228,818 acres are in cropland. At this time 6,391,943 acres or 52% needs conservation treatment applied as follows:

541,383 acres need annual cover of crop residues, cover crops, or other protection to meet conservation needs.

566,897 acres need some type of sod (grasses, legumes) used in rotation of crops so that the land is under cover for longer periods.

328,650 acres need only to be farmed on the contour instead of up and down slope.

3,173,453 acres need the extra protection of terraces, strip cropping, grassed waterways, or other outlets, and diversion terraces to properly manage runoff water.

1,224,013 acres have a drainage problem.

482,743 acres need a change in land use from cropland to permanent cover such as grass or trees to be adequately protected from erosion damage.

50,851 acres of irrigated cropland need improved cultural management, improved irrigation system, or water management.

23,953 acres of land in miscellaneous uses need various treatment.

### (b) Pasture

2,871,919 acres are in pasture. 627,994 acres or 22% now have adequate conservation treatment. 52,035 acres or 2% are not considered feasible to treat because of soil or moisture conditions or other reasons. 173,734 acres, or 4% need a change in land use away from pasture to woodland. 2,018,156 acres or 72% need conservation treatment applied as follows:

936,969 acres need reestablishment-such as by fertilizing, and reseeding to adapted grasses and legumes.

392,753 acres need improvement only. By adding a grass or legume to the stand already established, these acres can be brought up to full production and adequate cover for the land.

578,221 acres need protection only—management of cattle and grass to avoid overgrazing and to allow species to reseed in order to maintain good cover for the land and healthy plants.

110,213 acres need brush control to eliminate competition for sunlight, moisture, and fertility.

### (c) Forest and Woodland

In Wisconsin 14,058,160 acres are being used for forest and woodland. 7,249,312 acres or 52% now have adequate conservation treatment. The remaining 6,808,848 acres or 48% need conservation treatment as follows:

3,220,419 acres need planting to establish new stands or reinforce present stands of trees.

3,588,429 acres need woodland improvement work such as thinning, selective harvest, crop tree release, weeding, or other practices to improve quality.

On Woodland Currently Grazed: 1,534,389 acres need reduction or elimination of grazing pressure to protect the land against soil damage or to improve the cover of trees.

461,220 acres need grazing improvement practices such as reducing amount of timber and brush cover to be used principally for pasture rather than woodland.

## *Recommendations*

1. Continue state financial support for the research project to develop low cost sewage disposal systems on problem soils which will not support presently designed and state approved systems and also allow for utilization of the continuing state appropriations on other related research projects.

2. Provide for state financial support in accelerating the current soil survey program.

3. Expand the state watershed planning program to accelerate the PL-566 construction program through the provision of a State Watershed Planning Party.

4. Provide for detailed geologic investigations in watersheds.

5. Establish research to evaluate the hydrological relationship in channelization of streams in southeastern Wisconsin to estimate the extent of possible destruction to wetlands and wildlife.

6. Develop effective urban sediment control programs between soil and water conservation districts and incorporated areas.

7. Augment the federal–local technical assistance programs with state funds to expand technical assistance to landowners who wish to carry out basic soil and water conservation plans.

8. Conduct a state financially supported survey by the appropriate agencies through the Natural Resources Council of State Agencies on the extent of streambank erosion with thy intent of implementing a statewide program for streambank erosion control.

# SOLID WASTE DISPOSAL
# Agricultural

## *What Has Been Done*

Wisconsin farm animals include about four million cattle and calves, 1.6 million hogs, seven million poultry plus smaller numbers of other animals (which may be important locally). Most cattle and calves are dairy animals. A very rough estimate of the manure produced per day would be 150,000 to 200,000 tons from cattle and calves, 10,000 tons from swine and 500 tons from poultry.

This waste is roughly equivalent to that of a human population of 50 to 70 million people if common rule-of-thumb comparisons are used.

Major past efforts have been to encourage daily removal (and usually field spreading) of dairy manure, and to optimize the use of all manure as a fertilizer and soil conditioner for economic crops, especially corn.

Dairy farmers have almost universally adopted daily hauling as a handling method. Farmers generally make good use of manure as a fertilizer material. Manure applications are programmed into computerized soil test recommendations used by many farmers.

Regulations of manure handling have been related to Grade A milk sanitation standards.

## *Problems*

Changes in farming are causing important changes in the handling of animal manure. Costs of commercial fertilizer have dropped dramatically. This lessens the value of manure as a fertilizer material. Labor costs have increased and farmers are seeking labor saving ways of handling manure. Farming has become more specialized and concentrations of livestock in small areas has increased. Size of livestock operations is increasing. All of these changes create problems and questions such as these:

1. How can large volumes of manure be stored, transported, treated or recycled to the land in ways which are economically and environmentally acceptable?

2. What acceptable alternative methods to daily hauling of manure exist?

3. Under what conditions may barnyard manure and runoff pollute farm or other wells?

4. What are the maximum amounts of manure that can be safely applied to various kinds of land?

5. How may odor and fly problems be overcome?

In addition, public concern for and problems with the quality of surface waters are increasing. This, along with research data which show substantial losses of nitrogen and phosphates from manure spread on sloping snow-covered fields and from feed lots adjacent to surface water, raises questions such as:

1. Under what conditions should winter spreading of manure be restricted?

2. What are the environmental and economic effects of modifying animal lots and barnyards to exclude streams, lakes and ponds?

Problems with odors, dust and noise associated with large animal concentrations and with mixed farm and nonfarm housing are becoming severe. There is a strong need to develop land use regulations and alternative management systems to reduce present and prevent future odor problems. Spreading urbanization and growing numbers of nonfarm homes in farmed areas intensify problems of noise, odors, dust and insects which are associated with livestock and livestock wastes.

## *Laws*

The basic statutory authority for Wisconsin water pollution abatement is contained in Section 144.025 and 144.555 of the Wisconsin Statutes.

## *Regulations*

Ag 80, Ag 30 and Grade A pasteurized milk ordinance of PHS/FDA are used as the basic regulations for animal waste management on dairy farms to ensure proper sanitation.

The basic requirement calls for removal of manure, or storage thereof in such a manner so as not to be accessible to milking cows and prevents fly breeding. Odor must also be prevented.

The requirements cover cleaning of stanchion barns; calf pens; cowyards; loose cow housing and free stall housing. Breeding areas for flies must be eliminated.

## *What Is Being Done*

1. Research

a. Research is currently underway or planned on several alternative ways of handling animal wastes both in Wisconsin and neighboring states. A major study of nutrient utilization from manure, bacteriological transformations, and decomposition of animal manure has just been completed by the University of Wisconsin, and several reports are in print. Research projects vary in cost, size and scope. Results are disseminated when research is completed.

b. Rural well waters in certain areas of the state have relatively high nitrate contents. Research results indicate that farm animal wastes are a probable source of some of the nitrates. As fertilizer nitrogen applications become heavier, they may also become contributors. Considerably more investigation is needed to definitively ascertain sources of the excess nitrates.

2. Cost-sharing. The Agricultural Stabilization and Conservation Service has started a statewide cost-sharing program on animal waste man-

agement (REAP). Demand and need for cost-sharing greatly exceeds available funds.

3. Technical Assistance. Soil and Water Conservation Districts and the Soil Conservation Service are allocating increased technical assistance to farmers who have problems relating to animal wastes. Demand greatly exceeds available manpower.

4. Education. Five statewide conferences have been held by UW-Extension, state and federal agencies. Proposed regulations concerning animal wastes were widely discussed during 1971 and 1972. A series of regional workshops is planned for 1973; county and local meetings on this topic are becoming common.

5. Sanitary inspections. Sanitarians inspect each dairy farm on Grade A once in 6 months or more frequently if necessary. For manufactured milk the inspections are less frequent. Producers are required during fly season to spread manure directly on fields; or store in a pile on the ground surface, inaccessible to cows, for not more than 4 days and then spread on fields; or store for not more than 7 days in an impervious floored bin, or on an impervious floored platform and then spread; or stored in a tight screened and trapped manure shed; or effectively treated with larvicides; or dispose of it in such a manner so as to prevent fly breeding. Producers many times haul and pile manure in a field inaccessible to cows and where fly breeding will not affect milk or milk utensils.

Liquid manure handling, where manure is kept in an impervious pit for a period of time and is pumped out and spread at a time when the soil can best utilize it, is presently practiced.

Guidelines developed by the Wisconsin Dairy Cattle Housing Committee are used by regulatory agencies to enforce this manure removal requirement. Plans must be submitted and approved before such an installation is considered on a Grade A farm.

The Wisconsin Dairy Cattle Housing Committee has just completed Guidelines for Stacking of Solid Manure.

## *Recommendations*

1. Statewide regulations and accompanying legislative approval are needed to guide and protect investments by farmers, orient future activities of public programs and protect air and water quality.

2. Research is needed on:
   a. movement of pollutants from manure to ground water and surface water;
   b. odor control;
   c. techniques of animal waste storage and handling;
   d. costs and benefits of alternative animal waste handling strategies.

3. Much more public assistance to farmers via cost-sharing and technical assistance programs is needed. Funding should be substantially increased, by reallocation from other programs if necessary.

4. Interagency guidelines and working procedures need continuing attention:
   a. to insure that programs are complementary, and
   b. to make it easy for farmers to get integrated, rapid and useful responses from public agencies.

5. Continued development and incorporation of animal waste regulations into county sanitary codes, zoning ordinances and and health codes is needed to complement other programs such as cost-sharing, education and technical assistance.

6. A large-scale, cooperative program of education is needed to accompany programs of technical assistance, cost-sharing and regulations.

7. Problems of odors from animal operations need serious study as land use plans and land use regulations are developed by the state. A mechanism to protect farm and nonfarm occupants of rural lands from the problems created by strong odors drifting across property lines is becoming increasingly important.

# Municipal, Industrial, Private

## *What Is Not Being Done That Should Be Done*

Because of the large number of livestock owners and the wide range of site conditions, local people and local organizations need to become more involved in:

1. identifying sources of animal waste pollution in surface waters and ground waters;

2. setting up or reorienting action programs to correct serious problems;

3. working out comprehensive plans for streambank improvement which include consideration of animal wastes as well as sediment, flooding, etc.

If local support is not obtained, many programs on animal waste disposal are doomed to failure.

The programs of such local organizations as Soil and Water Conservation Districts should give even greater attention to the pollution of surface waters by animal wastes.

More facts are needed on the movement of nitrates to ground water. Research on both models, or simplified systems, and actual field conditions should be expanded and continued.

Integrated educational programs and continued refinement of interagency guidelines for manure handling are needed as large-scale corrective programs get underway.

Statewide regulations of animal wastes need to be adopted. These could include sanitary codes, zoning ordinances, building codes, etc., which give positive, factual guidelines and specifications to guide producers and local or state officials.

## *What Has Been Done*

Since 1919 when Chapter 144 of the statutes was created, there has been state supervision over refuse disposal. Except for the approval of plans for proposed incinerators, state level supervision was minimal until the advent of the sanitary landfill method of solid waste disposal in the early 1950's. A 1951 amendment of Section 60.72 of the statutes resulted in the establishment of a number of sanitary landfills owned and operated by municipalities at sites outside their corporate limits. For the most part, however, all levels of government gave minimal tax support to solid waste disposal. The enactment of Chapter 83, Laws of 1967, materially strengthened the state's position in solid waste disposal through establishment of a licensing program. Pursuant to this action, solid waste disposal standards were adopted and inspection and licensing of solid waste disposal sites began in the spring of 1969. Since that time more than 1,900 disposal sites and auto salvage yards have been licensed. Confirmed by field inspections, operational conditions at the disposal sites have improved to the point where the majority are in compliance with the Solid Waste Disposal Standards. Nearly all sites that were improperly located with respect to surface or ground water have been closed and properly abandoned.

During the three years of the licensing program substantial amounts of data have been collected, placed in a computerized data holding system, and made available to communities or agencies seeking inventory information for planning activities. In addition, the site licensing program has been computerized to increase processing efficiency.

Chapter 130, Laws of 1971, enables counties to plan and undertake various solid waste management activities. They may plan, establish, or operate solid waste management systems or may participate jointly with other counties, cities, villages or towns. Based on Chapter 130, solid waste management planning criteria (Wisconsin Administrative Code, Section LAD 3) were adopted. The criteria, which govern the development of county and multi-county solid waste management plans, were presented statewide to officials and to the public over the Extension Educational Telephone Network.

An information and education program was initiated by a statewide meeting of county and local officials and technical personnel. The meeting in cooperation with the U.S. Environmental Protection Agency, was directed at proper dump site closure and planning and operating sanitary landfill sites.

That initial meeting was followed by educational and informational meetings held throughout the state. These meetings, attended by approximately 2,100 persons, emphasized improved solid waste disposal and the need for planning and consolidating disposal systems.

In relation to the handling of abandoned motor vehicles the Wisconsin Legislature also enacted Chapter 131, Laws of 1971. This law prohibits the unauthorized abandonment of vehicles and declares that any vehicle left unattended for more than 48 hours without permission of the property owner is a public nuisance. Vehicles may be impounded by municipalities or sold directly to licensed salvage dealers if value is determined to be less than $100 and the vehicle is not stolen.

## *Problems*

1. Expanding volumes of solid wastes and limited areas for disposal.

2. Refusal of town boards to grant permission to municipalities to operate disposal facilities within the township.

3. Reluctance of some municipalities and private operators to operate their facilities in conformance with written orders.

4. Lack of technical assistance for municipalities to properly select, construct, and operate adequate disposal facilities.

5. Adverse effects on some efforts to institute new landfill sites due to the public's past experience with open burning dumps and lack of knowledge concerning sanitary landfills.

6. The improper disposal of toxic and hazardous wastes and lack of complete knowledge in this area.

7. Hesitancy on the part of many municipalities to actively investigate the possibility of cooperative solid waste management activities and a hesitancy to relinquish local solid waste systems in favor of areawide programs.

8. Reluctance throughout the state to use new or different techniques and equipment for the management of solid wastes.

## *Laws*

Section 144.43 authorizes development and adoption of minimum standards. Section 144.44 prohibits violation of the minimum standards and provides for annual licensing procedures.

Section 144.045 prohibits disposal in flood plains.

Section 144.46 prohibits solid waste disposal sites on shorelands and flood plains, except by special permit.

Section 60.72, as amended by Chapter 276, Laws of 1969, provides for the location of municipally-owned sanitary landfill sites outside of municipal limits.

Sections 59.07, 66.067, 144.30, 144.435, 144.437 and 144.445 authorize county involvement in a wide range of solid waste management activities including planning based on state criteria.

Section 342.40 prohibits the abandonment of motor vehicles and provides for removal and disposal of same.

## *Regulations*

NR 151 of the Wisconsin Administrative Code contains the regulations for solid waste disposal, collection and transportation.

H 62.20 of the Wisconsin Administrative Code contains sludge disposal regulations.

LAD 3 of the Wisconsin Administrative Code contains solid waste management planning criteria.

## *What Is Being Done*

All solid waste disposal sites are being inspected and licensed. During the first two years of the program (July 1, 1969 to September 30, 1971) the majority of solid waste disposal sites were issued conditional licenses since few complied with the Solid Waste Disposal Standards. Operators with conditional licenses were required to improve their operations.

Issuance of conditional licenses was not continued into the third licensing period, which began on October 1, 1971. Only sites in compliance with the Standards, as modified by certain exemptions, are now licensed.

All salvage yards are being licensed and required to operate in accordance with the Solid Waste Disposal Standards. This has resulted in closing of approximately 100 marginal operations where the operators elected to go out of business rather than license and meet the requirements.

Collectors and transporters of solid waste are being inventoried and required to obtain annual permits in order to assure safe and sanitary operation.

The names of known solid waste disposal site and salvage yard operators who have failed to apply for licenses or who operate in violation are being referred to the Bureau of Legal Services for legal action. Normally violators are called into informal hearings and then to formal hearings if they fail to respond. Continued violation results in the issuing of legal orders and then referral to the Attorney General if noncompliance continues. Referrals have resulted in both injunctions and forfeitures.

The solid waste disposal section is working toward completion of a state solid waste management plan, after receiving an initial grant in the spring of 1971 from the U.S. Environmental, Protection Agency. Background and inventory information is being collected and analyzed for development of recommendations for future statewide solid waste management activities.

To help meet the waste management needs of the state in the future the Solid Waste Disposal Standards are currently undergoing updating, revision and improvement. In general, the recommended changes include a strengthening of disposal requirements, clarification and rewording of certain sections, and broadening of topics covered in order to keep abreast of recent waste management technology.

Work is ongoing for the establishment of a model sanitary landfill at the MacKenzie Environmental Education Center. This landfill is intended to present the basics of proper landfill operation and to demonstrate that sanitary landfill is a viable alternative to the open dump, even when small volumes of waste are involved.

Based on a report by a Governor's Task Force on Recycling of Solid Wastes, an engineering study is being conducted to plan the development of a statewide solid waste recycling program.

## *What Is Not Being Done That Should Be Done*

1. Special Wastes—a statewide survey is needed to determine the

producers, quantities, disposal locations and disposal methods for special wastes characterized as toxic, hazardous, agricultural, hospital, sludges, etc. Current methods for handling and disposal need evaluation. Criteria must be established to adequately and safely handle and dispose of these wastes.

2. A sanitary landfill operator training and certification program is needed in order to create technical competence for land disposal operations throughout the state. The model landfill at the MacKenzie Environmental Education Center should be well suited for this program.

3. Continued efforts in public education are needed to improve statewide solid waste management alternatives and to provide information regarding feasible waste management alternatives.

4. Increased site surveillance, and collection and transportation service inspections are needed to insure nuisance-free and environmentally acceptable waste handling and disposal.

5. Completion, authorization, and implementation of a state plan for solid waste management is needed to provide guidance and direction to the wide range of waste management activities conducted in the state.

6. An introduction of waste management methods, other than sanitary landfill, is needed to allow communities to choose among various feasible waste management alternatives.

7. Technical assistance is needed for communities, counties, and regions for the planning and implementing of solid waste management programs.

8. There is a need to encourage and guide the development of recycling and waste reduction programs wherever feasible.

## *Recommendations*

1. Initiate a statewide survey of producers of toxic and hazardous waste and investigate methods of proper disposal of these wastes.
2. Initiate a landfill operator training and certification program.
3. Continue and expand public education efforts aimed at reaching a variety of audiences–general public, private, professional, governmental.
4. Provide additional personnel and funding for adequate surveillance of solid waste management facilities.
5. Encourage county or regional approaches to solid waste management.
6. Complete and implement state plan for solid waste management.
7. Provide technical assistance to communities for improving and developing solid waste management systems and alternatives.
8. Encourage and support development of new techniques for recycling and waste reduction programs.

# Highway Littering

## *What Has Been Done*

Highway littering was recognized as a problem in Wisconsin as far back as 1915 when the State Legislature enacted Chapter 533 of the statutes providing a penalty for littering ranging from a minimum of $5.00 to a maximum of $25.00. The increasing seriousness of the problem resulted in the enactment of Chapter 224 in 1967 which increased the penalty to a fine of not less than $10.00 nor more than $200.00, or not more than 30 days in jail or both. As a result, penalty warning signs with the message "$200 Fine for Throwing Litter or Trash on Highways–Keep Wisconsin Clean" have been located on freeways at 30 to 40 mile intervals and on other major highways at the outskirts of major cities. A similar message has been placed on the State Highway Map.

Supplementing the penalty approach to curtailing littering, the Highway Commission and some local highway authorities have placed waste receptacles at rest areas, waysides, and table sites. In addition, the Highway Commission has placed waste barrels, on an experimental basis, at several locations along state highways. The latter were found to have little, if any, effect on the volume of litter along the highway and, furthermore, the receptacles tended to create hazards due to traffic moving off and on the roadway.

Periodic news releases have been issued over the years advising the public of the extent of the problem both in terms of the quantity of litter and the cost of disposing of it.

## *Problems*

Though most American highway motorists indicate displeasure with unsightly roadsides, a recent Gallup Poll indicated that approximately 50% of those interviewed admitted to one or more littering practices. The problem is universal.

Litter on highways is not only unsightly, unhealthy, and costly to remove,

but it is becoming increasingly difficult to find municipal solid waste disposal sites which will accept, without a fee, refuse picked up along highways. It has become necessary in several locations for the state to utilize municipally and privately operated solid waste disposal sites on a fee basis.

Highway Commission annual costs (state reimbursement to counties for performing maintenance) for trash removal on State Trunk Highways has more than doubled in recent years from $326,700 in 1960 to $870,186 in 1971. The 1971 figure represents $710,300 attributable to labor costs, $153,000 due to equipment costs and the remainder due to administrative costs. The annual costs for litter removal do not include the costs of maintaining highway waysides and rest areas which is a separate maintenance program. Current trends in the payment of disposal fees indicate the cost of littering will increase even more in the future.

There are numerous reasons why people litter including carelessness, laziness, indifference and also that no trash receptacle may be available either on the highway or in the car. However, even the stricter enforcement of solid waste disposal laws, as they pertain to restricting the hours that town solid waste disposal sites are open, has indirectly contributed to the littering problem. Vacation household refuse which normally might be deposited by the general public at these sites is often deposited in wayside trash barrels or simply tossed along the roadside. Not only does this result in additional cost to the state in terms of collecting such refuse, but as pointed out earlier, may result in the state being charged for depositing the waste at the local solid waste disposal site where it should have been deposited in the first place.

A national survey of the littering problem revealed that approximately one cubic yard of litter was accumulated per month for each mile of interstate and primary highway. A typical cubic yard consisted of 59% paper, 16% cans, 6% plastics, 6% glass bottles and jars and 13% miscellaneous items. The volume of litter on any section of highway appeared to vary directly with the average volume of traffic on the highway. Though the statutes provide a penalty for littering on state highways, enforcement virtually requires detection by an officer during the actual act of littering. The penalty has not been much of a deterrent to date.

## *Laws*

Sections 60.70, 86.07 and 346.94 of the Wisconsin Statutes relate to highway littering.

## *Regulations*

There are no special state level regulations relating to highway littering. Some municipalities are enacting or considering local ordinances which would ban the sale of certain types of throw-away containers which constitute a significant portion of highway litter.

## *What Is Being Done*

Highway litter along state highway roadsides is picked up and disposed of as conditions require. Trash receptacles in rest areas, waysides and along table sites are regularly maintained. News releases highlighting the problem are issued periodically. "Keep Wisconsin Clean" penalty warnings and messages are being placed on highway signs and on the State Highway Map, respectively. Enforcement actions are taken in the rare instances of detection of an offense. Some municipalities are enacting ordinances which are indirectly aimed at the highway litter problem.

## *What Is Not Being Done That Should Be Done*

Anti-litter publicity and educational efforts may still be the most practical approach to the problem of reducing litter and should be increased and supported with factual data on the visual, health, and cost consequences of littering.

Banning or taxing the sale of certain disposable containers could have some effect on the problem, since a significant portion of the refuse items would be affected. Taxation, if revenues were applied to the cost of cleanup, could have some merit. Increasing fines or otherwise expanding enforcement may work to some extent.

## *Recommendations*

1. Establish through NRCSA a task force to develop methods for solving highway littering and related solid waste disposal problems.

2. Encourage publicity and educational programs aimed at discouraging littering.
   a. Promotion of a statewide system of distributing litter bags.
   b. Encourage industry to supply litter bags for state distribution.

3. Simplify the enforcement process or at least authorize experimentation in new approaches to enforcement.
   a. Investigate enactment of legislation which would provide a reward for information leading to arrest and conviction of a litterer.

4. Experiment in new or better techniques of encouraging the safe and orderly disposal of trash by the highway traveler.
   a. Investigate the possibility of enacting legislation which would require waste containers to be designed into new automobiles beginning with the 1976 models.

5. Investigate existing solid waste disposal laws to require local solid waste disposal sites to remain open for longer periods of time during summer months to allow vacationers to deposit their waste.

6. Require local solid waste disposal sites to accept highway collected litter without charge to the state.

# MINERAL RESOURCES

## *What Has Been Done*

As an expanding population makes ever increasing demands on our non-renewable mineral resources, planning for the use of these resouces has become essential. This involves two main problems: (1) identifying the nature and location of the mineral resources and (2) planning for mineral extraction. The latter includes use of the land prior to extraction, during extraction and after extraction. This may be called optimum multi-purpose sequential land use.

In urbanizing areas especially the loss of valuable, and unique, aggregate deposits (sand, gravel and stone) by urbanization and restrictive zoning has become a matter of national concern. Also of concern is the lack of centrally formulated, and administered, reclamation policies and standards.

In order to promote optimum multi-purpose use of mineral-bearing lands, including incentives for the protection of those deposits sensitive to destruction and the rehabilitation of mined areas, the Surface Mining Subcommittee of the NRCSA formulated a Mineral Conservation and Surface Mining Reclamation Act.

A bill (525S) based upon this draft was introduced into the 1971 session of the legislature. In this bill the provisions for mineral conservation were omitted but, of more concern, it was amended to exempt the producers of nonmetallic minerals from the provisions of the act. As nonmetallic minerals constitute over 98% of the minerals extracted in the state the amendment rendered the bill almost totally ineffective in controlling surface mining; however, it failed to pass.

## *Problems*

1. **Identification of mineral bearing lands.** Mineral deposits can be compared to lakes. They are three-dimensional bodies—some shallow and some deep; they must be used where they are; in some areas they may be numerous and in other areas they may be scarce. However, unlike lakes they are very seldom visible. The first step in any planning is therefore to identify and inventory mineral bearing lands especially in the vicinity of urban areas.

2. **Conservation of mineral deposits for future use.** Many mineral deposits occur in remote areas where conflicting land uses are minimal, however, the aggregate deposits with which we build our roads and our cities must be located close to the centers of use to maintain economical costs. They are therefore, extremely sensitive to "destruction" by being built over, restrictively zoned, or taxes out of existence. "In Denver, Colorado, the sand and gravel reserves were estimated originally to have been 925 million tons. As of 1961, approximately 15 percent had been used and 27 percent was still available but 58% had been 'urbanized'—built over or restrictively zoned." (J. Dunn and J. Broughton in "A Mineral Conservation Ethic for the State of New York.") This story is being repeated with increasing frequency throughout the nation. Incentives are needed to preserve these deposits for extraction.

3. **Planning for optimum multi-purpose sequential use of mineral lands.** Regrettably the common concept of a mined area is one of total desolation fit only for a dump. The numerous lakes, with surrounding high class residential areas, industrial sites, parks, etc., created by mining are generally not so recognized. It has been well demonstrated that mining can create greater secondary values, both aesthetic and financial, than those previously existing. Today rehabilitation and mining are carried on as simultaneous operations in larger deposits. Given the knowledge that a certain deposit has the potential to become, say, a viable lake, compatible land use plans can be developed for the surrounding area in order to take advantage of that ultimate use.

## *Laws*

Current state laws are adequate to control water pollution related to mineral resources. Of particular significance are the following:

SS.29.29(3) prohibits the discharge of deleterious substances into waters of the state from mining operations unless from approved treatment facilities.

SS.144.01 "Unnecessary siltation" from gravel washing, quarries, gravel and pits is defined as "other wastes" and subject to regulation.

Chapter 83, Laws of 1967, effectively controls air pollution from mining or smelting operations and also controls the use of abandoned operations as unsightly dumps.

If the mining or smelting operation uses surface water SS.107.05 requires the restoration of the waters, the orderly disposal of waste and tailings and leaving the land in a neat and orderly manner. This does not apply if ground water is used.

## *Regulations*

For many years the Division of Highways has attempted to control the condition in which contractors leave land used as a source of aggregates or earthborrow.

There are scores of local, and highly variable, ordinances directed toward mining and rehabilitation.

## *What Is Being Done*

The current major activity is at the federal level. The 1973 Senate Bill 425 calls for a national Mined Area Protection Act which would require that all states enact legislation for the protection and rehabilitation of mined areas according to federal standards. An ad hoc committee of the Department of Natural Resources is reviewing proposed federal legislation in order that any future legislation proposed in the state will be compatible. State

Senate Bill 39, 1973 Session, is a metallic minerals mining bill intended to provide for protection of the natural environment consistent with provision of mineral resources to satisfy society's requirements.

## *What Is Not Being Done That Should Be Done*

Lack of knowledge on the nature and extent of mineral lands and of uniform laws and regulations relating to the problems outlined herein is impeding the wise use of our mineral resources.

## *Recommendations*

1. Mineral bearing lands should be identified and reserved, especially in urbanizing areas.

2. Land use plans should include mineral extraction and mine reclamation.

3. Incentives should be provided at state level to encourage mineral conservation and optimum multi-purpose sequential use of mineral bearing lands.

4. Reclamation plans and practices should be regulated at state level with advice from local planning agencies.

5. The state Legislature, with the aid of state agencies, and with the fullest cooperation of the mineral industry, should continue to work towards the development of legislation for the rehabilitation of mined areas.

# AESTHETICS
# Billboards

## *What Has Been Done*

Through passage of Section 84.30, Wisconsin Statutes, in 1959 and subsequent implementation and enforcement, Wisconsin fully complied with Subsection 131, Chapter 1, Title 23 Highways, U.S. Code. This resulted in a defined and positive control over all signs and informational media along and within 660 feet of any interstate highway right-of-way in the state. With enactment of state legislation in 1971, the state's responsibility in regulating highway advertising signs greatly increased. The new legislation complies with the Federal Highway Beautification Act of 1965 and results in more restrictive regulation of signing along or visible from the previously regulated interstate system as well as an extension of controls to the Federal-Aid Primary System. The impact of the change is that more rigorous controls will be exercised in relation to nearly 6,000 miles of highway compared to the more limited regulation previously exercised over only 478 miles of highway. In terms of financial impact, the administrative costs of the former program were $8,400 in 1970, whereas $5,000,000 will be required in each year of the 1973-75 biennium for sign removal costs alone (reimbursements to the sign owners by the state were not part of the former program) in addition to administrative costs which will be considerably higher than required for the former program.

Administrative rules for the new law have been adopted to cover permit procedures, methods of applying for licenses by outdoor advertising firms, bond requirements for out-of-state companies, details about the control of signs visible beyond the 660 foot control zone, on-premise regulations and similar factors. In addition, a new inventory of affected signs has been conducted by the Division of Highways.

## *Problems*

Billboards, in general, are in conflict with the natural scenic qualities of the landscape. The conflict can be caused by too many signs in a particular area, and also by signs which are either distracting, dilapidated, garish, oversized or otherwise unnecessary.

The new billboard legislation should do much to improve the scenic qualities in the areas adjacent to the state's Interstate and Federal-Aid Primary Highway Systems. However, although the legislation is more strict than federal law requires, it falls short of the still stricter billboard legislation enacted in some other states. The Wisconsin law does not control advertising on other rural highways.

The state law does go beyond federal requirements, however, by regulating all signs that are **visible** from the designated highways, in addition to those within 660 feet of the right-of-way.

Local governments have generally failed to restrict the proliferation of billboards and some state authority may be desirable to enforce minimum standards in areas not now regulated. Proliferation of billboard signing is particularly a problem at some of the state's unique natural scenic areas.

## *Laws*

**State Highways.** Authority is contained in Section 86.19(2), Wisconsin Statutes. This law controls, by permit, any signing within the highway right-of-way.

**Interstate and Federal-Aid Primary Highways.** Authority is contained in Section 84.30, Wisconsin Statutes. This law controls erection and maintenance of outdoor advertising signs along or visible from the travel lane of any Interstate or Federal-Aid Primary Highway, establishes a system of licensing for advertising companies, and provides for just compensation for removal of signing which was legal and in existence at the date of enactment of the law.

Note: An issued permit does not relieve the permittee from the duty to comply with all local and state rules, regulations, and ordinances pertaining to signs and sign structures.

## *Regulations*

**State Highways.** Chapter Hy 10, Wisconsin Administrative Code.

**Interstate and Federal-Aid Primary Systems.** Chapter Hy 19, (Rev.) Wisconsin Administrative Code.

## *What Is Being Done*

Regulations are being enforced and permits issued as per Sections 84.30 and 86.19(2), Wisconsin Statutes.

Zoning assistance is being provided by the Division of Planning and District Highway Offices to individual counties upon request, which should help in controlling outdoor advertising in areas not under the control of the state. Municipalities are being encouraged to adopt comprehensive zoning ordinances which include controls regulating the number, size, lighting and spacing of signs.

## *What Is Not Being Done That Should Be Done*

Present state sign control legislation should be augmented by law requiring county and municipal adoptions of ordinances which are inclusive of sign controls sufficient to regulate outdoor advertising in accordance with a minimum standard. This is necessary to extend controls to highway systems not presently subject to state controls.

An agency of state government should be empowered to adopt minimum billboard control standards for communities where those local communities fail to adopt ordinances on their own.

# Scenic Easements & Highway Beautification

The state should be empowered to control billboard advertising in the state's unique natural scenic areas.

More research should be undertaken to determine how standard highway signing can relieve some of the pressures for commercial directional advertising.

## *Recommendations*

1. The state should intensify its efforts towards guiding and encouraging counties and municipalities toward their voluntary adoptions of ordinances which are inclusive of sign controls consistent with a minimum standard.

2. Legislation be enacted giving the Highway Commission authority with respect to local zoning ordinances as they relate to aesthetics and scenic beauty along roads and highways similar to that contained in shoreland and flood plain zoning laws (Section 59.971 and 87.30, Wisconsin Statutes). This authority would include power to adopt minimum standards, review and approve all local ordinances and to adopt ordinances for local units of government where they fail to enact them on their own.

3. Legislation be enacted which would protect the natural scenic areas of statewide concern from problems of billboards and signs.

4. Other approaches to highway billboard and sign advertising, such as advertising centers set up in rest areas, wherein travelers could obtain information on lodging, eating, and other facilities, should be investigated.

5. A concerted appeal should be made to industry to seek its utilization of methods of promotional advertising other than billboard and sign advertising.

## *What Has Been Done*

An easement is a right or privilege to use the land of another for a special purpose. Scenic easements are in common use in Wisconsin to ensure the preservation or scenic enhancement of lands adjacent to state trunk roads for such public purposes as beautification, conservation, and highway safety. Easements are used to restrict the construction of visual distractions such as billboards, junk yards, and other unsightly uses of the land.

In Wisconsin the initial recognition of the merits of scenic easements adjacent to highways occurred in 1938 in conjunction with highway improvements along the Great River Road Parkway, but the effort was interrupted by World War II and lay dormant until 1947. A positive step was taken by the 1939 Legislature which enacted a bill authorizing the State Highway Commission to pursue the acquisition of restrictive development easements on private land for the purpose of reserving the scenic aspects along the Mississippi River.

In 1961, the Wisconsin Legislature in creating ORAP, expanded the scenic easement program to enable the acquisition of easements along highways in certain additional areas of the state and to provide some funds for that purpose.

In extending and expanding ORAP in 1969, the Legislature authorized acquisition, development, and maintenance of scenic easements in all parts of the state and continued the special funding for that purpose.

The Wisconsin Highway Commission has authorized, approved, and acquired as of September 1, 1972, 1,359 easements covering 16,112 acres of land. Total costs of the program, which have been principally derived from ORAP Funds, have amounted to $1,295,453 as of September 1, 1972. The budgeted resources for the scenic easement program amount to

$180,000 annually, obtainable from General–ORAP Funds. Of this amount, approximately $100,000 has been spent annually during the past three years on development costs alone. The development costs, which were not allowed previously, include installation of wells and toilet facilities, construction of parking areas and turnouts, and development of boat landings.

Other easement programs which sometimes have effects similar to the highway scenic easement program are those administered by the Department of Natural Resources. As of July 1, 1972, these include programs in Game Management involving 207 easements for 18,464 acres of land, Fish Management involving 363 easements on 3,995 acres of land, Parks and Recreation involving 5 easements on 118 acres of land, and Forest Management involving 3 easements covering 84 acres of land.

In addition, designated state and federal wild rivers are also protected by easement from development to some extent. These include parts of the following rivers: the Wolf River in northeastern Wisconsin, the Pike River in Marinette County, the Pine River and its tributary Popple River in Florence and Forest Counties, and the St. Croix, Namekagon, Brule and Flambeau Rivers in northwestern Wisconsin.

## *Problems*

Insufficient regulation limiting the size of on-premise signs, controlling junk yards and other noncompatible land uses adjacent to highways is increasing the cost of easement acquisition.

Although the ORAP-200 program provides $180,000 annually for highway easement acquisition, this amount may not be adequate because of recent modifications in the law. Whereas previously the allotted amount was required to be spent only for *acquiring* easements, it is now permissible to utilize these funds for developmental costs.

The authority to revoke variances of scenic easement restrictions which are in perpetuity and need modification from time to time is exercised by the Governor. This task is a bothersome chore and brings about much delay in the execution of variances.

The effects of local zoning ordinances are given consideration at the time of acquisition of easements; however, problems often arise due to the laxity of local enforcement and the ease of acquiring variances to zoning.

Also, there is a general misunderstanding of the purposes and restrictions of scenic and other easements by landowners, resulting in unwarranted suspicion, fear and opposition. In addition, because of the increased concern for the environment and some of the resulting anti-highway campaigns, it has become more difficult to convince the general public of the need for highway scenic easements.

## *Laws*

Chapter 353, Section 20.370(7)(a) and Section 20.395(2)(b) of the Wisconsin Statutes relate to the scenic easement program.

Wisconsin Statutes ss. 23.09(2)(d), and 27.01(2a), and 28.02(2) relate to the scenic easement aspects of the game, fish, parks, and recreation programs. Wisconsin Statutes ss. 30.251 and 30.26 relate respectively to the preservation of the scenic features of the Wolf River and the Wild Rivers.

## *Regulations*

There are no special state administrative rules or regulations relating to scenic easements. Local zoning ordinances serve as regulations in some instances and are helpful when enforced.

## *What Is Being Done*

The scenic easement program is continuing under ORAP-200 and has been expanded to include easement acquisition in all areas of the state, along with the development of scenic overlook sites. Easement acquisitions are occurring regularly with the Division of Highway's District Offices submitting potential easement site locations as the need or opportunity dictates. The Division of Highway's Central Office determines the final selections with priority going to those sites having the most desirable aesthetic qualitities and those sites being most endangered by potential adverse development.

Other easement programs of the Department of Natural Resources are also being continued.

## *What Is Not Being Done That Should Be Done*

There should be statewide control of the size of on-premise billboard signing, junk yards and other noncompatible land uses adjacent to highways, which would assist in decreasing the need for and the cost of easement acquisitions.

Since the Highway Commission specifies and sets restrictions for highway scenic easements, they should be empowered to grant variances to these restrictions as the need requires. However, any area acquired in fee for scenic purposes, if no longer required, should still be disposed of according to Section 84.09(5) of the Wisconsin Statutes which requires approval of the Governor.

Where a landowner has granted an easement to the state and has had his rights restricted in terms of engaging in specific activities on the land under easement, the local tax assessment on that land should reflect the owner's restricted rights to that land.

Those involved in scenic easement programs should expend more effort to educate the general public and

# Natural Beauty

landowners about scenic easements, stressing the benefits which will accrue to them, as landowners, as well as to the general public.

Regional and county planning commissions should be encouraged to incorporate scenic and other easement proposals in their planning.

The Department of Natural Resources should be encouraged to utilize the scenic easement program more frequently, (a) in the protection of the scenic and aesthetic portions of the state's wild and scenic rivers, and (b) in conjunction with their state land acquisitions.

## *Recommendations*

1. Legislation regulating the size of on-premise billboard signing, junk yards, and other noncompatible land uses adjacent to highways on a statewide basis is urged to assist in decreasing easement acquisition costs.

2. Legislation is urged which would delegate authority to the Highway Commission to permit variances of scenic easement restrictions thus expediting this procedure and relieving the Governor of this chore. Any area acquired in fee for scenic purposes should still be disposed of according to Section 84.09(5), Wisconsin Statutes.

3. The state should seek ways to encourage better cooperation with local government in enforcing zoning ordinances when they pertain to the purposes of easement acquisition. At the same time, it should be required that local zoning ordinances accommodate scenic easement acquisition.

4. Greater effort should be expanded in the scenic easement programs to educate the general public and landowners concerning easements, stressing the benefits which will accrue to both landowners and the general public.

5. Legislation should be enacted requiring assessors to reflect the existence of scenic easements through modifications in tax assessment.

6. Regional and county planning commissions should be encouraged to incorporate scenic and other easement proposals in their planning.

7. The educational facilities of the Natural Beauty Council should be utilized to promote public awareness of the need to eliminate the disposal of litter and junk in public rights-of-way.

8. The Department of Natural Resources should be encouraged to use scenic easements more frequently to protect the scenic and aesthetic portions of the state's wild and scenic rivers and to more frequently use easement acquisition along with their various state land acquisition programs.

## *What Has Been Done*

The Legislature has recognized the importance of maintaining and improving our natural beauty. This is evident from their support of the program and their adoption of statutes 15.347 and 59.07 (59). These two statutes create a state Natural Beauty Council and provide for the creation of county beauty councils to coordinate beautification efforts.

All previous work done has been in the realms of education and motivation through press releases, radio spot announcements, TV programs, and personal contact with interested individuals.

## *Problems*

Apathy on the part of the general public appears to be a major problem. The public has not yet accepted the fact that the destruction of natural beauty is because of their own actions and, therefore, can be corrected.

No one would question that industry is necessary in Wisconsin; however, it is also true that industrial procedures do destroy natural beauty. Constant vigilance is necessary in order to keep this destruction at an absolute minimum.

Another of the major problems in the destruction of natural beauty is vandalism. Here, apathy on the part of officials, judges and parents appears too often and little is accomplished in deterring this criminal action.

## *Laws*

Wisconsin State Statutes 15.347 and 59.07 (59).

## *Regulations*

Regulations appear on a statewide level in the form of laws prohibiting littering land and water. Many zoning regulations provide teeth for the main-

tenance of local areas of natural beauty. Hereto, a high degree of citizen interest could greatly increase their efficiency.

### *What Is Being Done*

The good work that is being done is primarily the result of interested civic organizations taking on the projects of maintaining natural beauty and cleaning up desecrated areas as service projects.

These programs are often enhanced by including an award program to encourage and recognize the fine work being done by the citizens. It also acts as an education and motivation program.

### *What Is Not Being Done That Should Be Done*

An active interest by all officials and all organizations would greatly enhance this program.

## *Recommendations*

Industry should be encouraged to cooperate with this group and bear some of the expense of the education and motivation programs through:

1. Litter bags could be provided and distributed under their advertising budgets.

2. Radio and TV spots on their own programs could include messages on natural beauty preservation.

3. Handout material designed to appeal to the young people could be provided.

# FORESTS AND PARKS
# Forest Fire Control

## *What Has Been Done*

Forest fire control became a serious problem for Wisconsin in the late 1800's with such fires as the Peshtigo, Hickley, Comstock and Phillips. Hundreds of people were killed and over 1,400,000 acres of virgin timber were destroyed. By the late 1920's and 1930's public concern had caused action to bring about some control of this problem. The main thrust in development of Wisconsin's fire control organization began in the late 1930's and early 1940's and continues today. The physical plant was developed with the WPA and CCC programs of the depression era.

Fifty-three ranger stations have been established, 149 lookout towers were erected and about 4,000 miles of telephone line were constructed. A full-time force of about 165 personnel was employed. This was enlarged to about 400 during the fire seasons with seasonal employes. The force was also supplemented with hundreds of fire fighters from the CCC's and other government work programs.

In the late 1940's it became apparent that the state could no longer depend on large crews of fire fighters from federal programs. Fire fighting had to be mechanized. From 1947 to 1952, 37 crawler tractors with fire plows were purchased and outfitted. This has grown until the present force consists of 87 tractors. Maintenance of the large communications system was also becoming a manpower problem. A mobile radio system was installed, and telephone lines were reduced, until presently about 2,000 miles are in existence.

Prior to 1930 it is estimated that between 2,000 and 3,000 fires occurred annually and burned about 500,000 acres. Since 1930 the number of fires has stabilized around 2,000 but the acres burned only occasionally exceeds 10,000 acres.

## *Problems*

1. **Apathy.** Wisconsin's success in fire control can also be viewed as a problem. As the large, disastrous fires become more infrequent, apathy infects the public as well as within the fire control organization itself.

2. **Financial–Personnel and Equipment.** The inflationary trends and social pressures of recent years with increased demand on tax dollars have been felt in fire control as well as other government programs. More efficient use of personnel and equipment is demanded. Worn out and obsolete equipment must be replaced.

3. **Increased Risk of Fires.** Railroads continue to cause nearly 50 percent of the forest fires in Wisconsin. Railroad fires present two basic problems. Such a large number of fires ties up a large amount of manpower and equipment. Compounding this is the peculiarity of railroad fires to occur in series often along several miles of right-of-way and with a potential for a major disaster.

The current explosion of residential and recreational development in wild land areas is producing new areas of concern for fire control. They provide increased risk of a fire starting, complicate suppression action and increase the potential loss to wild fires.

4. **Extending Fire Protection to Additional Areas.** The Department continues to receive requests to extend wild fire control to areas presently outside of organized protection. There is also need to increase the effectiveness of the cooperative fire control programs.

## *Laws*

Most of Wisconsin's fire control regulations are embodied in Chapter 26 of the Wisconsin Statutes. Other forest protection statutes are Section 134.60 Christmas tree, cutting and transportation; 192.44 railroad liability for fires; Section 941.10 negligent handling of burning materials.

## *Regulations*

Wis. Administrative Code: NR 30, Forest Protection Districts

## *What Is Being Done*

1. **Apathy.** Public awareness is maintained with a strong fire prevention program. Full use of the national Smokey Bear program is utilized. Considerable effort is put forth by Department personnel on the local level with school, civic organizations, mass media and individuals.

An intensive fire control training program is conducted within the organization to maintain an effective force. Special effort has been placed on fire organization.

2. **Financial–Personnel and Equipment.** Efforts to resolve this problem are directed at three general areas of activity. These are fire detection, communications and equipment and supplies.

The detection system formerly was manned with seasonal employes who worked on the ground when not manning the lookout towers. Over the past several years vacancies are replaced with limited term personnel who are employed on an hourly basis. Aerial observation from aircraft has also been increased with two new patrols activated and at least four more planned for the coming biennium. The ultimate goal is a dual detection system utilizing both aircraft patrol and a reduced number of key lookout towers. It is expected that the more flexible system will be efficient and economical. The positive features of each type can then be exploited.

The fire control program is presently remodeling its radio system to replace as possible. Commercial telephones are replacing state telephones wherever adequate commercial facilities are available.

Most of the fire control tractors purchased from 1947-1952 remain in

# Forest Management

service. Although they have served the state well, they are wearing out and repair parts are difficult to obtain. Three styles of tractors are being field tested and studied to determine which types are best suited to specific situations. Replacement is planned to begin in the 1976-77 biennium.

The fire control program is eligible to receive federal government excess property at little or no charge. Full advantage has been made of this program. All but one of the fire control aircraft have been acquired from this source. Large quantities of other equipment. tools and materials have been acquired.

Recent new developments include use of prescribed burning controls to reduce fire hazard growth and danger of wild fires.

3. **Increased Risk of Fires**

Continuous contact is kept with the major railroads in the state to upgrade the effectiveness of the spark arresters in their equipment. Right-of-way maintenance is encouraged with varying degrees of success.

A slide-tape fire prevention program directed towards the residential and summer home problem has been developed. The state has participated in a joint production of a fire prevention movie on the same subject.

## *What Is Not Being Done That Should Be Done*

1. The railroad companies continue to be the major cause of wild fire. Efforts on the part of the railroads to fireproof their right-of-way is spotty at best.

2. There is little attention being paid at the local level on the expanding fire hazard and risk from recreational and residential land development.

3. Shortage of time and resources has not allowed proper attention to the needs of areas outside of the organized fire control program.

4. Worn out and obsolete fire tractors need replacement.

## *Recommendations*

1. A strong fire prevention and internal training program should be maintained to ward off the effects of apathy. A strong fire control program is essential to the welfare of the state. Modernization of the fire control organization should continue, making use of new technical developments to adjust to economic pressures.

2. Legislative action is needed to enforce clearing of railroad rights-of-way. Provision should be made to allow the state to do the necessary work and charge the railroad when they fail to do it themselves.

3. Wild fire should be made a primary consideration in establishing zoning regulations. The state should actively participate in development of stronger controls in this area.

4. Studies should be implemented and resources directed to improve fire protection in cooperative protection areas. Special attention should be directed toward the Mississippi River counties because of the continuing fire hazard in some areas there.

## *What Has Been Done*

Originally the forests of Wisconsin covered the entire state with the exception of limited areas of prairie, oak openings and sedge marshes, largely located in the southern and western counties. Presently the forest resource accounts for 43 percent of the land area of the state and is remaining relatively stable.

Wisconsin's forestry program had its beginning at the turn of the century and shortly after the "hay day" of logging. It was then that legislators recognized that the forests were not inexhaustible, that forest property required protection and management and that the plow could not follow the axe on the cutover area. State forest reserves were set up in 1907 and became the nucleus of three of our present state forests.

Two important constitutional amendments set the stage for the forestry program as we know it today. In 1910 voters adopted an amendment exempting forestry from the constitutional prohibition from engaging in work of internal improvement. Later, in 1924, a second amendment was adopted to provide that the state appropriate money for the purpose of acquiring, preserving and developing the forests of the state. The amount appropriated in any one year was not to exceed two-tenths of one mill of the taxable property of the state. This revenue currently finances a large part of the forest management and protection programs.

About 1925, the agricultural boom broke with the result that many landowners, including those holding cutover lands for speculation, could no longer pay taxes. A wave of tax delinquency followed and created a situation which eventually led to passage of the Forest Crop Law in 1927 and creation of the county forest program. Private landowners now had the tax relief that was needed for the practice of forestry. Northern and central counties, with hundreds of

thousands of acres of tax title lands also took advantage of the opportunities under the Forest Crop Law and established the county forest program now active in 28 counties and on over 2¼ million acres.

The first state tree nursery was established in 1911 at Trout Lake. Seedlings from this nursery were used in 1918 to establish the now famous Star Lake plantation. This plantation was established under the direction of E.M. Griffith, Wisconsin's first state forester as a guide to all future tree planters in northern Wisconsin. Other nurseries were developed as demand for trees increased. A peak production of 38,000,000 trees was reached in 1940 during the CCC and WPA work programs and again in 1959, one of the Soil Bank years, when production climbed to 42,276,000.

Management assistance to private forest landowners was given as early as 1913. The program, however, was not fully developed until 1946 with the appointment of two farm foresters. Recognizing that private landowners control over 60 percent of the forest lands of the state and of the contribution of these lands to the wood using industry, management assistance has now been made available to private forest landowners in all counties.

Since the initiation of the program of providing technical forestry assistance to private forest landowners, nearly 100,000 private owners have received management help. These forest owners have planted 500 million trees, selectively harvested 2 billion board feet of timber and carried out timber stand improvement practices on 400,000 acres of forest to improve the quality of the timber growing during this period. This program has accounted for 80 percent of all the sawtimber harvested, 10 percent of the pulpwood, 66 percent of the tree planting and 25 percent of the intermediate stand improvement practices by all classes of forest landowners—public or private. These achievements are impressive but the new dimension of demands upon these privately owned lands and their resources points to the need for a continued effort to assure that the private owner accepts the responsibility of proper stewardship that accompanies the privilege of land ownership.

As forest management became more intensified, the need arose for better control over forest insects and diseases. It was apparent that insects and diseases were causing greater damage to the forests than fire. This situation resulted in the passage of the Forest Pest Control Act in 1955 and creation of a Pest Control Section within the Bureau of Forest Management. Entomologists originally looked to chemicals for control of forest pests but are now leaning more and more to silvicultural and biological control methods wherever possible. In emergencies, however, chemicals may be used with approval of the State Pest Control Council.

Wisconsin participated in the last two forest surveys, one completed in 1956, and the other in 1968. The information is invaluable in planning the location of new industry or expansion of present ones. The Department of Natural Resources employs two utilization experts who assist in analyzing this resource data for industry as well as providing group training in grading, sawing and marketing.

In summary the Forest Management Program provides management, services and protection to improve productivity of Wisconsin's 14.9 million acres of forest land to increase the sustained yield flow of forest products now and in the future to the wood using industrial complex, to assure a continuing growth of this manufacturing industry to the economy of the state, and to provide multiple use benefits of a varied nature to meet the recreational demands and needs of the people of the state.

## *Problems*

1. **Pressure to Sell County Forest Land.** There is continued and increasing pressures on counties to withdraw lands from county forests for sale to private individuals and corporations. Uses range from expansion of cranberry marshes and recreational developments to mining operations. Such private uses normally preclude full public use even with restriction clauses written into deeds. With increasing populations and land values, pressures to sell county lands can be expected to increase. Before these lands may be sold or leased by the counties they must be withdrawn from entry under the County Forest Law. In determining public benefits to accrue from withdrawal as opposed to continued entry it is difficult to assess the long-term impact involving economics, and loss of public enjoyment and use.

Developers interested in large tracts of land are attracted to the county forests not only because of their many attributes but also because they have only one landowner to deal with. Requests for withdrawal are being received at an accelerating rate. These requests also show a tendency towards larger acreages per request and for commercialism to be involved. The purported possibility of increased revenues to local units of government is playing an increasing role in making withdrawal requests appear more attractive to the counties.

2. **Need for Urban Forestry Assistance.** Larger metropolitan areas are plagued by continued environmental deterioration of the inner city areas. At the very least, undesirable and probably unsuitable and unhealthy living and working conditions are common because of noise, odor, and visual pollution. The lack of open space and little or no vegetation contribute to these conditions.

Deteriorating economic conditions, poor working and living conditions, and slum development result in the exodus of the buying public. Urban sprawl into the rural countryside with attendant environmental degradation

of the surrounding areas is proceeding at a rapid pace.

Many of the environmental problems associated with urban living and the development of urban areas relate to forests or trees. Solutions to these problems often require the involvement of technically trained and competent foresters. Federal legislation and programs have been proposed which would enable and encourage involvement of state forestry personnel in urban forestry programs.

3. **Reduction in the Commercial Forest Land Acreage**

Demands on commercial forest land for an ever increasing variety of uses have the potential to create serious limitations of available raw material to Wisconsin's wood using industry. While the majority of these demands are necessary to serve the needs of Wisconsin's population they will have an adverse effect on the amount of raw wood available.

Acquisition of forest land for public recreational pursuits is accelerating. The area required to satisfy increasing population needs (mainly urban sprawl), transportation (roads and airports), and mining are also reducing commercial forest acreage. Additional area is lost to commercial recreational developments including man-made lakes and ski hills. This type of demand may soon include retirement villages.

Exerting even greater demands may be those for wilderness areas and preservation zones. Included in this area of use are acreages involved with wild rivers and aesthetic zones and corridors. While any single usage may not appear to exert extreme demands on the commercial forest land base, collectively they most certainly will.

4. **Inequitable Forest Land Taxation.** Assessors are required to assess the value of real estate at the full value which could ordinarily be obtained at a private sale. The trends in forested land sales in past years have been progressively upward. This results in forested land being taxed at high levels whether the land is held for forestry, aesthetics, wildlife, recreational uses, speculation or residential purposes. In addition, local assessors are not uniformly applying guidelines in the "Wisconsin Property Assessment Manual" published by the Department of Revenue.

5. **Loss of Effective Chemicals as a Silvicultural Tool.** Concern for environmental side effects has brought about bans of certain persistent broad spectrum pesticides previously used in forest management, except in cases of emergencies. Effective and economical substitutes are needed for chemicals such as DDT. Without such substitutes the forest resources cannot be protected from insects and disease and nature will remove more wood than man can harvest.

The restricted use of certain herbicides is also serious. Chemicals are an economic and practical way to dispose of unwanted trees and vegetation. At the present time one-tenth of all volume on Wisconsin's forest land is of low quality. We must find ways to replace these trees with others that are of high quality. Reforestation efforts may be severely limited if chemical limitations are continued.

## *Laws*

### Federal Laws

PL 81-729–Cooperative Forest Management Act
PL 84-540–Agricultural Act of 1956
PL 87-110–Forest Pest Control Act
PL 89-764–Environmental Opportunity Act
PL 91-190–National Environmental Policy Act

### Wisconsin Statutes

Section 1.11–Wisconsin Environmental Policy Act
Section 23.09–Protection, Development and Use of Forests
Section 23.11–General Powers
Section 24.085–Sale of State-owned Land
Section 25.30–Reforestation Fund
Section 26.30–Protection of Forest Land from Insects and Disease

Chapter 28–State and County Forests

Section 70.335–Sustained Yield Tax Law
Section 70.58–Forestation State Tax
Section 77.01-77.14–Forest Crop Law
Section 77.16–Woodland Tax Law

## *Regulations*

Wisconsin Administrative Code

NR 33–Sustained Yield Forests
NR 35–Zones of Infection of Forest Pests
NR 40–State Forests
NR 45–State Parks and Forests Miscellaneous
NR 80–Use of Pesticides on Land and Water Areas of the State of Wisconsin
NR 89–Use of Toxic Insecticides on Forest and Noncrop Areas

## *What Is Being Done*

Wisconsin's current forest management programs are as follows:

1. **Northern State Forests:** Manage six state forests containing 387 thousand acres for sustained yield timber production and to provide varied facilities for public recreation. Standing timber is sold as stumpage to private contractors and the forest is cultured to produce a maximum quantity and quality of timber. Recreational facilities are developed for campgrounds, picnic areas, canoe campsites, primitive forest camping, snowmobile and hiking trails, and suitable areas are managed for wildlife production. State forests provide work projects for youth camps and for inmate forestry camps in cooperation with the Division of Corrections for rehabilitation.

2. **County Forests:** The county forests are a state-county partnership whereby state foresters provide management and technical assistance on 28 county forests containing 2¼-million acres entered under the County Forest Law. Guidance, financial and technical assistance is provided in the development of multiple use management for timber production and recreational facilities. The nature of the responsibilities performed is similar to the northern state forests with the exception that administration rests with the county boards.

3. **Private Forestry:** Technical forestry assistance is provided to Wisconsin's private forest landowners on a request basis. Service involves management of forest lands for timber products, cultural improvement operations, and encourages wildlife production for public recreation. The service is similar to the Soil Conservation Service and county agents' assistance on agricultural lands.

4. **State Nurseries:** Four forest tree nurseries are operated to grow and distribute suitable species of trees for reforestation and shrubs for wildlife for sale for reforestation throughout the state. Some 2¼-million free trees are also distributed to youth groups such as FFA, 4-H and school forests.

5. **Forest Pest Control:** Detection surveys and evaluation of biological factors are carried out to determine the need for forest pest control action and the appropriate silvicultural or chemical control measures to be employed. Action is taken on insects and diseases threatening forest resources of the state. Pesticides are evaluated to determine their effectiveness in control of forest pests and in their effects upon wildlife. Recommendations are provided for safe application and to control insects and diseases on public and private forest lands and on public recreational areas.

6. **Forest Inventory:** Periodic forest inventories and surveys are conducted on a statewide or forest basis to maintain current data on forest resources of the state. Statistical sampling procedures utilizing aerial photographs are employed and reports are distributed.

7. **Forest Products Marketing:** Technical assistance is provided the wood using industries in current manufacturing processes, marketing potentials and in feasibility studies concerning new forest industry estab-

## *Recommendations*

1. Pressure to Sell County Forest Land.
   a. Provide counties or state the authority to zone public land areas to preclude development. This would further discourage withdrawal requests of county forest land.
   b. Added collection and documentation of data establishing economic return to local government as a result of public use and ownership. Also define and place a value on the intangible benefits of public ownership.
   c. Require that the proposed development cannot be satisfied by utilization of other than public lands before withdrawal can be considered.
   d. Establish policy that "Public Use" is a higher land use for existing public lands, both state and county, than private ownership when considering total society needs.

2. Need for Urban Forestry Assistance.
   a. Develop a state urban forestry technical assistance program within the Department of Natural Resources.
   b. The Department to provide planting stock for the establishment of appropriate vegetation on urban and suburban projects.
   c. Develop some type of tax law or tax relief program for private owners to encourage preservation and protection of open, wild, or wooded areas from destruction or undesirable development.
   d. Expand the cost sharing program under Agricultural Stabilization and Conservation Service jurisdiction, or create new programs to establish, improve, and maintain open areas, green belts, etc., under private ownership.

*Continued on page 100*

lishment, modernization and expansion of existing industries. Group training sessions in grading, sawing and marketing are conducted. Individual counseling in plant flow and manufacturing processes is provided. A bimonthly "Forest Products Marketing Bulletin" is edited and coordinated for publication and distribution.

8. **Forest Tax Law Administration:** Wisconsin's Forest Crop and Woodland Tax Laws are administered to maintain and distribute records of annual state forestry aids paid to counties and towns, payments in lieu of taxes on state-owned lands, collections of severance taxes under the County Forest and Forest Crop Laws and to audit County Forest Forestry Funds.

9. **Sustained Yield Tax Law:** Technical assistance, liaison and accountability to the forest management plan is provided to Menominee Enterprises, Inc., for their 225-thousand acre forest area for which special tax computation methods are provided. All forest operations are examined to determine their compliance with the law, sustained yield management plan and schedule of areas to be harvested.

10. **Other Functions:** Periodically inspect, post and clean up where necessary due to public use the 617 state owned islands in northern Wisconsin so as to hold them in public trust. Provide cooperative management of forest lands owned by other state and local public agencies. Cooperate in the management and educational use of Wisconsin's 367 school forests and mark or designate all timber to be harvested. Manage the 13 timber harvest demonstrational forests. Function as forestry specialists for the Agricultural Conservation Program. Cooperate with federal and state authorities in implementing employment programs on public forests during times of unemployment. Guide forest fire control outside of established protection districts.

Management and services are provided through a staff of professional foresters, trained technicians and specialized personnel as entomologists and pathologists.

On a statewide basis, forestry activities related to land management on privately owned forest lands account for 40 percent of the program. The staffing of professional foresters is the limiting factor in obtaining designated statewide management goals for forest lands in private ownership.

## *Recommendations* –*Continued*

3. Reduction in the "Commercial" Forest Land Acreage.
   a. Intensify forest management efforts on commercial public and private forest acreages.
   b. The most direct solution would be more complete utilization of timber on areas presently being harvested. The principal of multiple use management must be applied on more acreage as opposed to single use.
   c. Zoning imposed at the county, regional or state level would be desirable.

4. Inequitable Forest Land Taxation.

   Initiate legislation to achieve the following:
   a. Zoning of selected forested lands to prohibit residential, industrial, or agricultural use so that lands in this zone will be taxed for the forestry use rather than for other potential uses.
   b. Provide for a percentage of normal tax rate for forested land which provides for certain specific public benefits (i.e., public access for hunting, fishing, picnicking, etc., wildlife, water or aesthetics).
   c. Periodically revise the Woodland Tax Law and Forest Crop Law which give a tax incentive to landowners who practice forestry. Some items of the Woodland Tax Law which should be considered for revision or inclusion are minimum acreage accepted, institution of a penalty clause and contract length increase.
   d. Legislation which would give the Department of Revenue more direct control over operations of the 1,837 local assessors.
   e. More frequent and intensified training of local tax assessors by the Department of Revenue.

## *What Is Not Being Done That Should Be Done*

1. Public forest land in Wisconsin is not well established as a permanent program. There is constant pressure to divert it to private use. Permanent property boundaries should be established and every effort made to acquire land within them allowing no private purchases of existing public ownership.

2. The urban environment is not being maintained in a desirable and aesthetically pleasing condition. Programs need be developed that enhance the living experience in our cities.

# Parks and Recreation

3. Forest resource management is a long-term investment. Forest areas need be designated as commercial forests and every effort made to insure that they will remain in this use so as to guarantee our future needs for all of the goods and benefits that forest land provides.

4. Forest land is not being taxed equitable with other real estate. Ways must be found to treat forest land taxation so as to separate the land from taxation of the growing crop as is done in agriculture.

5. Although much research has been conducted, practical and economic substitutes have not been found for such chemicals as DDT and 2,4,5 T. Without them forest protection from disease, stand conversion and timber stand improvement have become uneconomical.

## *What Has Been Done*

The state park system began in the year 1900 with the establishment of Interstate State Park. By the mid 1920's, the state owned 16 parks and forests totaling 197,957 acres. These parks were located in areas throughout the state. In 1937, Southern Forests were established and by 1940 the state had title to 19 properties totalling 13,107 acres in parks and 176,729 acres in forests.

In the 1960's, the park system grew vigorously with the advent of ORAP 100 (Outdoor Recreation Act Program). This was the one cent/package tax on cigarettes which was used to finance park acquisition and development.

As of 1967, the state had 55 recreational properties totalling 95,000 acres.

In 1969, ORAP-200, a bonding program, was established to finance acquisition and development for state parks and forests through 1981.

The 1969 law also provided for operations and maintenance to be funded through a formula of 165/10,000ths of the total assessed evaluation of the state. The user fees collected are matched by monies from the formula.

As of 1972, 65 state park projects and four state forests have been established totalling 110,000 acres.

## *Problems*

1. Costs for acquisition have risen, slowing down the program. During the first ten years, ORAP funds have remained the same but average costs for recreational lands have increased from less than $100/acre to over $400/acre. The result was that about ¼ as much land was acquired at approximately the same cost.

2. Excessive and unnecessary roads exist in some forest and park properties that cannot be closed because they are town or county roads. Towns particularly are reluctant to close and vacate roads as it could result in a loss of gas tax, and have on occasion refused road vacation. Roads now may not be closed without town board approval.

3. Destruction of parts of the resource in parks and the forests is occurring through malicious vandalism, or indifferent attitudes on part of the public such as the painting of rock faces, carving on trees, littering of natural areas, and digging or destroying rare plants.

4. Inadequate visitor and shop facilities throughout the system for use by management personnel as well as park and forest visitors. Shops and storage and visitor contact buildings are included. Loss of revenue, lack of a headquarters for emergency purposes results in less ability to provide more complete service to the visitor.

5. Long time interval required for implementation of some projects such as road projects for development.

6. Inadequate time interval between acquisition and development–in other words–allot more time for wise and adequate planning and environmental study prior to public use.

## *Laws*

Public Parks and Places of Recreation–Chapter 27, Statutes

Acquisition and Development–Sections 23.09 and 23.30, Statutes

State Park Roads–Section 84.28, Statutes

MORP Park–Section 23.09 (25), Statutes

## *Regulations*

Park Use–Wis. Admin. Code Chapter NR 45

State Parks–Wis. Admin. Code Chapter NR 41

State Forests–Wis. Admin. Code Chapter NR 40

## *What Is Being Done*

The purpose of the parks program is to provide a system of parks for educational and recreational use and to preserve and protect outstanding natural scenic features, archaeological areas, historic sites, geological areas, and animal and plant communities–all with statewide significance. The long-range objective is to insure that the recreational needs of the present and future are adequately and efficiently met.

The emphasis of the recreational forests program is to provide and maintain certain forest lands for outdoor recreation.

The program includes the acquisition, development and management of the two units of the Kettle Moraine State Forest, Point Beach State Forest and Apostle Islands State Forest for outdoor recreation and forestry.

The Kettle Moraine and Point Beach forests provide the largest area of land available for extensive outdoor recreation in the heavily populated southeastern region of the state. Campsites, picnic areas, beaches, hiking and bridle trails, scenic drives, lookouts, geological points of interest, hunting, fishing and bicycling comprise the major recreational facilities provided for public use. The Apostle Islands State Forest provides a wilderness setting with primitive camping and hiking.

Emphasis of the ORAP programs has been, and will continue to be, land acquisition and development of public recreational facilities. The average cost of land per acre since establishment in 1900 is $164/acre. Over the last ten years, the average land cost has been $295/acre. It is estimated the cost to complete acquisition in the park system at today's prices would be $455/acre.

Lands purchased under the ORAP programs are receiving the basic facilities required to make them usable to the visitor, and many old facilities (some dating back to CCC and WPA days) are being upgraded or replaced. The major portion of funds used for acquisition and development is derived from the ORAP Bonding Program. In addition, monies are obtained from federal aids, a motorcycle license fee and the Forestry Mill Tax.

Statewide park use guidelines designating types of development and use have been prepared based on potential of each area, private sector participation and in concert with the State Outdoor Recreation Plan.

A major effort is being made to stretch the operation dollar through purchase of time saving equipment and improvement of operation methods.

The following table shows the source of acquisition and development funds:

| | Land Acquisition | | Development | |
|---|---|---|---|---|
| Fund Source 1971–72 | Parks | So. Forests (1) | Parks | So. Forests |
| ORAP–200 | 76% | 42% | 70% | 71% |
| Federal Aids | 20% | 32% | 30% | 29% |
| Motorcycle Lic. Fee (2) | 4% | | | |
| Forestry Mill Tax (3) | | 26% | | |

(1) So. Forests (Northern & Southern Units–Kettle Moraine and Point Beach State Forests).

(2) $2 of the motorcycle license fee is to be set aside for acquisition, development and operation of motorcycle recreation areas.

(3) 70.58 (2) of State Statutes–an annual levy of .2 of a mill/dollar of the valuation of the property of the state is to be used for the purpose of acquiring, preserving and developing the state forests lands. Four percent of the Mill Tax revenue is to be used in the Southern Forests for land acquisition.

Funds for operation and maintenance of state parks are derived from two major sources.

1. **User Fees.** User fees provide approximately 50% of the operation and maintenance funds. Following is a breakdown of the various user fees and the percent of the total operation and maintenance monies provided by each fee.

a. Admission Stickers-22.9%
b. Camper Fees-20.3%
c. Misc. Sales (surplus items, etc.)-4.0%
d. Other Fees (wood sales, electricity, etc.)-2.8%
TOTAL-50.0%

2. **ORAP-200 Formula Funds.** Each year, an amount equal to .0165% of the state's equalized property value is set aside from the General Fund for operation and maintenance of the state park system and other Departmental programs. From this fund, an amount equal to income from user fees is used to supplement the state park operation fund.

The Southern Forests operation and maintenance funds are not attached to the user fee or the bonding program. The two units of the Kettle Moraine and Point Beach obtain operation and maintenance monies from the Forest Mill Tax explained earlier. Yearly, 8% of this fund is applied toward operation of these three properties.

## *What Is Not Being Done That Should Be Done*

1. Land acquisition is not proceeding at a fast enough rate.

2. Speed up discontinuance of roads at the town and county level lying within proposed boundaries of state parks and forest to accommodate meaningful development and provide proper management.

3. Curtailing of vandalism and other destruction and loss of public property.

4. Moving ahead on implementation of visitor and shop/storage building facilities for use by management and park and forest visitors.

5. Move ahead with faster development of some types of roads and road surfaces to service the park visitor.

6. Increase relevant environmental awareness programs.

## *Recommendations*

1. Devote substantially greater reserves to the land acquisition program. Complete several major high value purchases immediately.

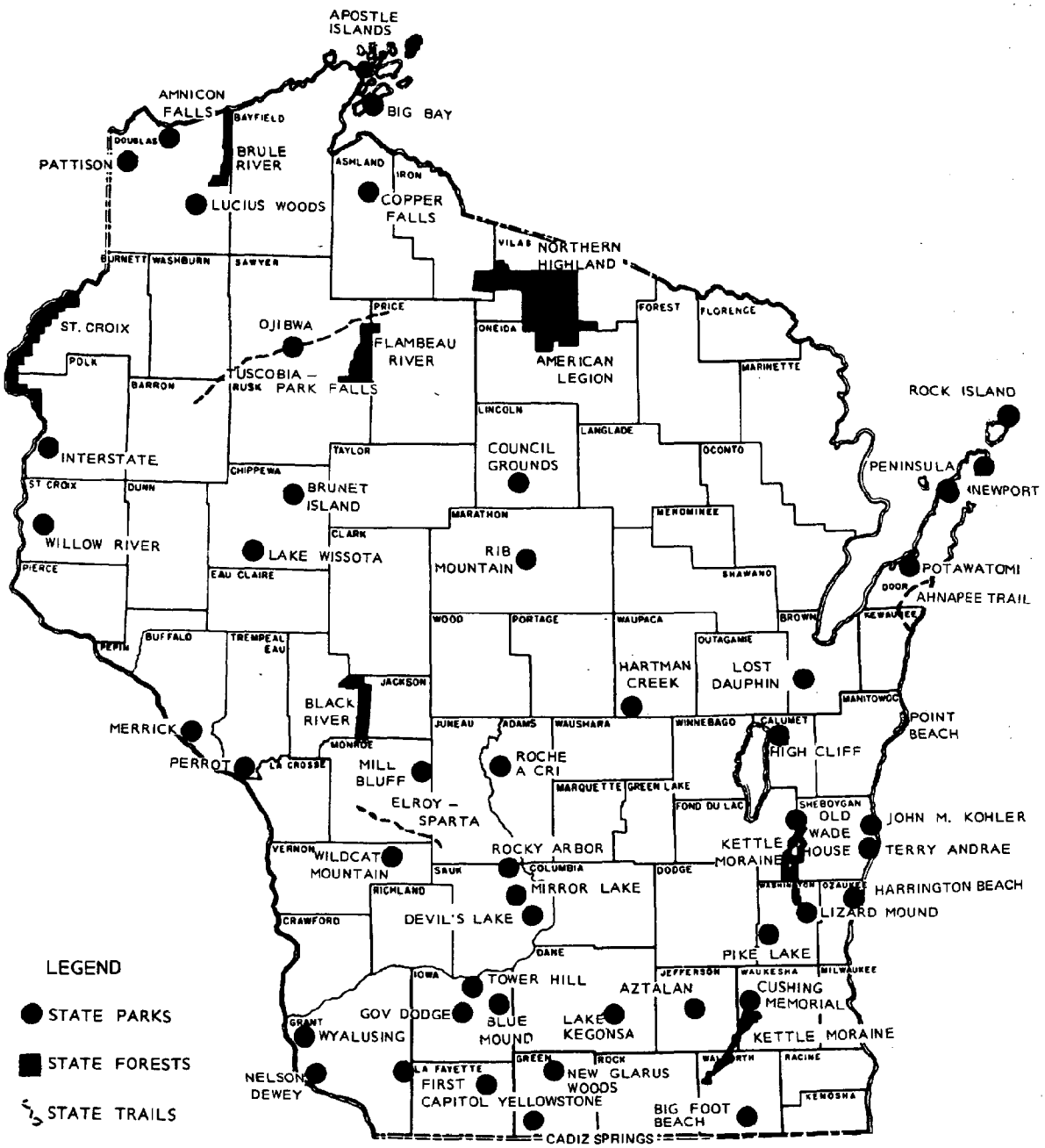
2. Develop legislation to provide for road discontinuances within state park and forest boundaries where required. Compensation to municipalities for loss of gas tax may be in order.

3. Appropriation of additional funds for more enforcement personnel and equipment and for more environmental awareness programs with schools, groups and visitors. Complete integrated statewide radio network that includes all park and forest properties and local enforcement agencies as well.

4. More and better visitor contact facilities and service facilities in order that management can provide a service to the park and forest visitor.

5. Provide for road construction at a faster rate through improved procedures with the Department of Transportation.

6. Provide a greater time interval between the time of acquisition and opening the property to the public. Allow for most land acquisition road discontinuance and at least two years for proper planning and environmental study before implementation occurs at any property.


APOSTLE ISLANDS
AMNICON FALLS
BIG BAY
PATTISON
BRULE RIVER
LUCIUS WOODS
COPPER FALLS
NORTHERN HIGHLAND
AMERICAN LEGION
ST. CROIX
OJIBWA
FLAMBEAU RIVER
TUSCOBIA – PARK FALLS
INTERSTATE
COUNCIL GROUNDS
BRUNET ISLAND
WILLOW RIVER
LAKE WISSOTA
RIB MOUNTAIN
ROCK ISLAND
PENINSULA
NEWPORT
POTAWATOMI
AHNAPEE TRAIL
HARTMAN CREEK
LOST DAUPHIN
POINT BEACH
BLACK RIVER
MERRICK
PERROT
MILL BLUFF
ROCHE A CRI
HIGH CLIFF
ELROY – SPARTA
OLD WADE HOUSE
JOHN M. KOHLER
KETTLE MORAINE
TERRY ANDRAE
ROCKY ARBOR
WILDCAT MOUNTAIN
MIRROR LAKE
HARRINGTON BEACH
LIZARD MOUND
DEVIL'S LAKE
PIKE LAKE
TOWER HILL
AZTALAN
CUSHING MEMORIAL
GOV DODGE
BLUE MOUND
LAKE KEGONSA
WYALUSING
KETTLE MORAINE
NELSON DEWEY
FIRST CAPITOL
YELLOWSTONE
NEW GLARUS WOODS
BIG FOOT BEACH
CADIZ SPRINGS
LEGEND
STATE PARKS
STATE FORESTS
STATE TRAILS

# NATURAL AREAS AND FEATURES OF SCIENTIFIC AND EDUCATIONAL INTEREST

## *What Has Been Done*

Natural areas are tracts of land or water in a natural or near natural condition which have been so little modified by man's activity that they contain nearly intact native plant and animal communities. Natural biotic communities are complex and not completely understood. The best remaining examples, if preserved, are reference points against which the success or failure of man's ever increasing manipulations of the natural environment may be measured. These areas provide the means by which we can understand the long-rangy effects of what we are doing to the environment, provide protected habitats for plants and animals in increasing danger of extinction, and give us a link with the past, when man and nature lived more closely in harmony with one another. Scientific areas are the best and most representative natural areas reserved especially for scientific and educational use.

Wisconsin was the first state to develop a scientific areas system and continues to be a leader in the field of scientific areas preservation.

As of October 1972, 101 natural areas encompassing 14,000 acres have been designated as state scientific areas. A continuing effort to identify and examine other areas for suitability as scientific areas is being made. When such areas are identified and their ownership determined, arrangements are made for agreement on management practices and preservation with the owners.

In several counties other natural areas have been inventoried to provide:

1. A list of potential future scientific areas.

2. A listing of natural history areas for educational use at the elementary and high school level–both to alert teachers concerning the availability, and landowners and managers concerning the unique values of these areas as a first step in the goal of preservation.

Once areas have been designated as scientific areas, they are examined regularly to insure that they are not deteriorating, that management recommendations are being followed, and that misuse for recreation or other purposes is not occuring.

## *Problems*

Lack of personnel to carry out the inventory and management functions.

Lack of funds to acquire those lands that are not in public ownership or whose owners do not wish to cooperate in their preservation for natural area purposes.

Authority to require adherence to management agreements once they have been agreed to.

The encroachment of population and pollution impacts on even the most remote areas.

## *Laws*

The statutory authority for the scientific areas program is contained in Section 23.27 which established the Scientific Areas Preservation Council. The Council within the DNR through additional legislation was provided with a small operations budget in 1965 and in 1971 an acquisition fund of $50,000 annually under the ORAP program.

## *Regulations*

Presently scientific areas are protected by land holding agency and their regulations. Special regulations applying to all scientific areas are planned for inclusion in the Wisconsin Administrative Code.

## *What Is Being Done*

The designation of scientific areas is proceeding at an accelerating pace.

Once scientific areas are designated, their description and location is made available to scientists.

Acquisition is accomplished through:

1. Agreement with county, state and federal agencies for designation and management of areas under their control. Fifty-eight scientific areas have been established on state parks, forests and wildlife areas; nine areas are located on county park or forest lands, and the federal land accounts for four areas.

2. Agreement with private groups for designation and management (The Ridges Sanctuary in Door County).

3. Purchase, through available funds, is extremely limited. Presently a 32-acre tract, Tellock's Hill Woods in Waupaca County, was purchased with ORAP funds earmarked for scientific area acquisition.

4. Cooperation with groups such as The Nature Conservancy recommending use of their funds to purchase suitable areas, and eventual gift of these areas to a suitable public agency such as DNR or universities. The Nature Conservancy is easily the most active private group and nineteen of the designated scientific areas have been acquired by them.

Continuing search and inventory of potential areas through contact with state land managers, scientists, and interested public groups.

## *What Is Not Being Done That Should Be Done*

The major concern is not with the procedures that have been developed, but with the rate at which the work is being accomplished. The pressures of an increasing population and the increasing interest in outdoor recreation are resulting in the destruction of many potential areas before they can be added to the scientific area system.

Another deficiency is in the field of other natural areas–areas that are not quite good enough to be designated scientific areas, but are entirely adequate for environmental education at the elementary and high school level, and for the general public. The mechanism for identifying and preserving areas for this use needs improvement.

Immediate expansion of the county natural area inventories, especially in southern and eastern Wisconsin to identify both potential scientific areas and other natural areas before they are inadvertently destroyed. These inventories should be promoted by the Natural Resources Council of State Agencies.

The Department of Natural Resources field employees in each district should be responsible for completion of the surveys with the advice and leadership of the Scientific Areas Preservation Council and strong support from faculty of universities, colleges and secondary schools.

The Scientific Areas Preservation Council, to meet its responsibilities under Section 23.27 of Wisconsin Statutes has determined that a minimum of 200 scientific areas containing 400 biotic communities are required for an effective state scientific area system. An undetermined additional number of areas will be needed to protect unique geologic and archaeologic features and rare or endangered species of plants and animals. At this time only half of this goal has been met.

Since natural areas remain only as scattered small remnants, location and preservation of these vital areas cannot be postponed.

## *Recommendations*

1. Inventory the natural areas on both public and private land, utilizing a classification system to insure that the best remaining examples of all types of native biotic communities are identified.

2. Acquire and preserve by both public and private means sufficient natural areas so that educational institutions at all levels of instruction will have available for their use all of the biotic types native to their region of the state.

3. Prepare a county-by-county register of other natural areas, in addition to those in the state scientific area system. As inventories are completed, the Scientific Areas Preservation Council should prepare county registers of natural areas and make these listings available to elementary and secondary schools. Such listing would not guarantee preservation or access, however, many natural areas could be made available, thereby diverting some educational use away from the fragile scientific areas.

4. Develop mechanisms to defend natural areas and particularly scientific areas from encroachment caused by man's alteration of surrounding areas including changes in normal water drainage systems and the effects of air, water and noise pollution.

Since these areas are small, buffer zones should be established where development is controlled either by zoning or easements. Heavy traffic volume highways for example must not only be kept out of natural areas, but also kept sufficiently remote to prevent damage to areas due to pollution.

5. Protect the unique vegetation of scientific areas from abnormal animal populations, and excessive public recreational use, through the use of special management regulations and control as required.

Special deer hunts in several scientific areas within state parks have been and will continue to be necessary to reduce abnormal populations developed due to the refuge status of the park.

Many of the scientific areas receive some public recreational use. In a few cases, this use has resulted in damage to vegetation. Usually this can be controlled by limiting access and facilities. However, at Parfrey's Glen use was so heavy that special regulations were developed which restrict public use to designated trails.

# THE AIR RESOURCE

*"Conservation . . . as it seems to me from the point of view of the not distant future of the human race, is more important than all other movements now before the people."*

*Charles R. Van Hise*

## Resource Contributors:

**Brooks Becker**
Department of Natural Resources

**W.L. Lea**
Department of Health and Social Services

## *What Has Been Done*

Prior to 1967, there was no organized statewide air pollution control program in Wisconsin. Air pollution problems were handled by the Board of Health which had no specific legal authority other than Chapter 280 and Section 146.14 of the statutes. Responsibility for a comprehensive program was given to the Department of Resource Development and its successor, the Department of Natural Resources, under Chapter 83, Laws of 1967. At the start of the program in 1968, emphasis was placed on locating problem areas in the state, making air quality studies and developing statewide rules and programs. Statewide air pollution rules became effective July 1, 1970, providing a framework of control by both state and local government programs in a joint effort as prescribed in the 1967 laws.

Under the Federal Clean Air Acts, the Southeastern Air Region was designated in September, 1969, and the remainder of the state was divided into 7 air regions in April, 1971. Wisconsin's air quality control regions are shown in Figure 1.

Air quality standards for suspended particulates, sulfur oxides, carbon monoxide, hydrocarbons, and photochemical oxidants were adopted for the Southeastern Air Region in 1970, and an implementation plan to achieve the state standards was completed in February, 1971. The Department's air quality standards of 1970 and the implementation plan to achieve these air standards were superseded by national primary and secondary air standards established pursuant to the Clean Air Act of 1971. Another pollutant, nitrogen dioxide, was also included.

A statewide implementation plan to achieve the secondary national air standards was prepared, adopted in January, 1972, and approved by the U.S. Environmental Protection Agency in May, 1972, subject to minor changes. Simultaneously, the control rules were revised as a part of this plan, effective April, 1972. The federal requirement to achieve secondary national air standards in 1975 forced some retroactive and stricter emission limits in the Southeastern Air Region, and in Brown, Outagamie, and Winnebago Counties.

Redirection of the Department's program in 1971 to conform with federal law, involved development of a statewide implementation plan, an updated statewide emission inventory, increased air quality monitoring, and new control subprograms extending to large numbers of small sources. Regulation of major sources, while altered in some instances by changing federal requirements, continued. On July 1, 1972, program status exclusive of Milwaukee County was as follows:

Facilities evaluated for compliance–553

Facilities corrected without orders being issued–26

Facilities probably in compliance–361

Orders issued–135

Orders complied with–31

Orders referred for prosecution–2

Orders in preparation–11

In addition, Milwaukee County has 58 major emitters upgraded to meet emission standards.

Prior to October, 1972, 450 complaints had been investigated, 320 facilities had been inspected, 23 facilities had completed abatement programs, and 120 satisfactory control plans had been submitted with 26 more plans in preparation. Eight air pollution hearings had been held. This data does not include Milwaukee County.

Of the 709 state owned facilities surveyed in response to Executive Order 14, control programs have begun at the 16 facilities found to be marginal with respect to the particulate emission limits.

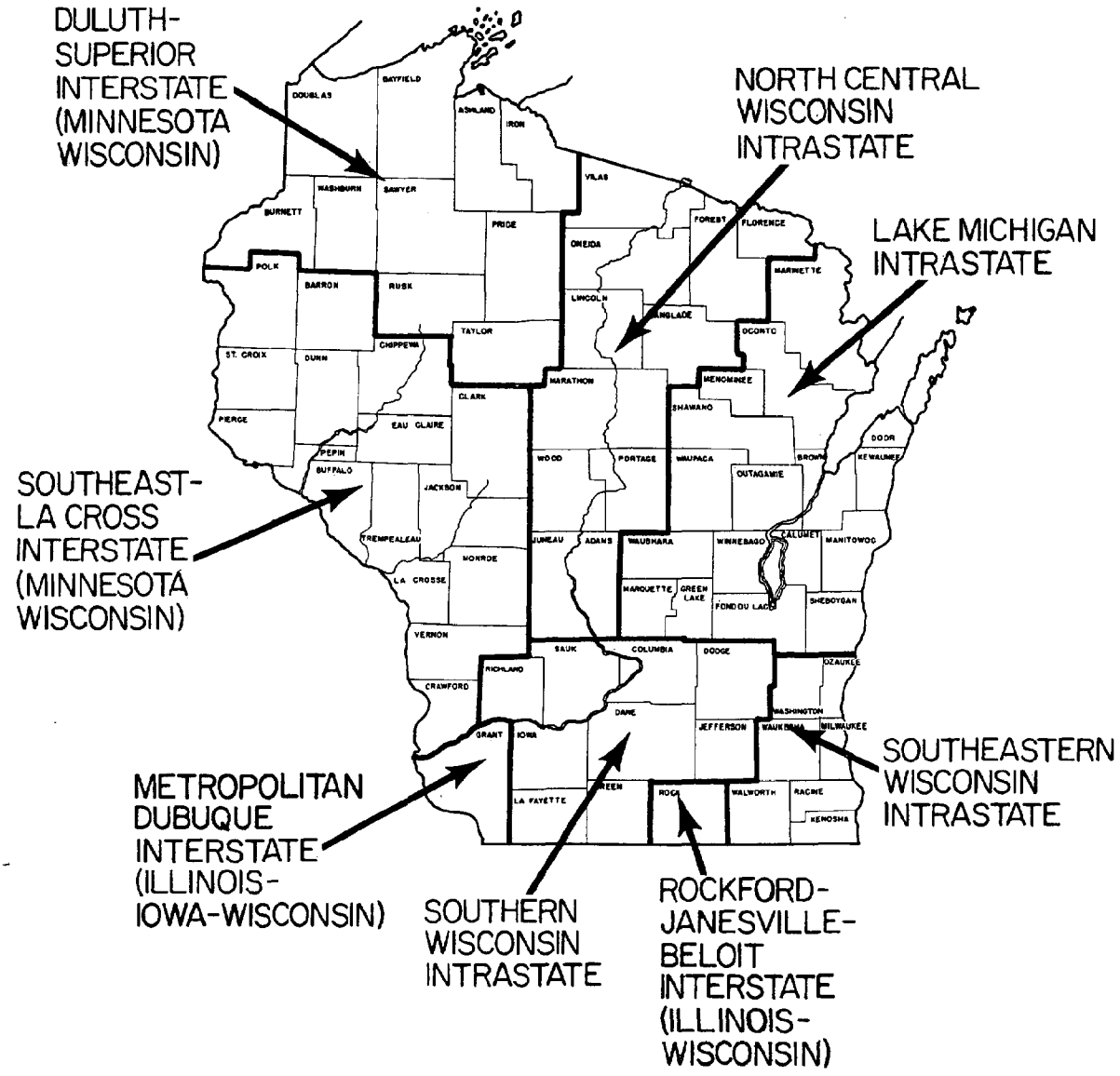
The Solid Waste Disposal Standards, which stress conversion from open burning to sanitary landfill, brought improvement or correction in approximately 25% of the 1,300 sites involved.

A special order on atmospheric mercury emissions from a chlor-alkali chlorine plant was complied with.

A statewide air quality surveillance network has been developed, involving Department, county, city, and university cooperators and federal participants. At present, monitoring proceeds at the following number of sites: 79 suspended particulates, 11 coefficient of haze, 41 sulfur dioxide, 11 oxidant, and 9 carbon monoxide, and 9 sites are proposed for nitrogen dioxide when an approved sampling method is found. Air quality data is entered into a statewide report. The air pollution monitoring activities in the state are shown in Figure 2.

Present knowledge of state air quality indicates these problem areas: the downtown area of Milwaukee averages 100 /m3 suspended particulates, requiring a major effort to achieve the 60 /m3 secondary national air standard. In Brown, Outagamie, and Winnebago Counties, downtown city levels range up to 88 /m3 Elsewhere, levels are variable depending on local point sources. For sulphur oxides, parts of the Milwaukee County are slightly above secondary air standards of 60 /m3. A special study in 1971 indicated downtown Milwaukee met the national carbon monoxide standard. For oxidants, only the downtown area of Milwaukee briefly exceeded the hourly limit of .08 ppm, indicating the need to control solvent and gasoline evaporation losses.

Analysis of statewide mortality statistics indicates no distinct evidence of possible air pollution affects. Analysis was made of five year average


DULUTH-
SUPERIOR
INTERSTATE
(MINNESOTA
WISCONSIN)
NORTH CENTRAL
WISCONSIN
INTRASTATE
LAKE MICHIGAN
INTRASTATE
SOUTHEAST-
LA CROSS
INTERSTATE
(MINNESOTA
WISCONSIN)
METROPOLITAN
DUBUQUE
INTERSTATE
(ILLINOIS-
IOWA-WISCONSIN)
SOUTHERN
WISCONSIN
INTRASTATE
ROCKFORD-
JANESVILLE-
BELOIT
INTERSTATE
(ILLINOIS-
WISCONSIN)
SOUTHEASTERN
WISCONSIN
INTRASTATE
DOUGLAS
BAYFIELD
ASHLAND
IRON
VILAS
WASHBURN
SAWYER
BURNETT
PRICE
ONEIDA
FOREST
FLORENCE
MARINETTE
POLK
BARRON
RUSK
LINCOLN
LANGLADE
OCONTO
ST. CROIX
DUNN
CHIPPEWA
TAYLOR
MARATHON
MENOMINEE
SHAWANO
CLARK
PIERCE
EAU CLAIRE
DOOR
KEWAUNEE
PEPIN
BUFFALO
WOOD
PORTAGE
WAUPACA
BROWN
OUTAGAMIE
JACKSON
TREMPEALEAU
JUNEAU
ADAMS
WAUSHARA
WINNEBAGO
CALUMET
MANITOWOC
MONROE
LA CROSSE
MARQUETTE
GREEN LAKE
FOND DU LAC
SHEBOYGAN
VERNON
SAUK
COLUMBIA
DODGE
OZAUKEE
RICHLAND
CRAWFORD
DANE
WASHINGTON
JEFFERSON
WAUKESHA
MILWAUKEE
GRANT
IOWA
GREEN
ROCK
WALWORTH
RACINE
LA FAYETTE
KENOSHA

(1963-1967) mortality rates comparing Milwaukee County, which has somewhat higher suspended particulate and sulfur oxide levels, to the rest of the state for 93 cardiovascular and respiratory diseases.

If air pollution aggravates or causes respiratory and cardiovascular diseases due to stress or irritation on these systems, it may show up in the statistics. However, the total rates seem to indicate little to support this hypothesis.

| | Milwaukee County | Rest of State (71 Counties) |
|---|---|---|
| All cardiovascular | 365* | 392* |
| All respiratory | 92 | 70 |
| TOTALS | 457 | 462 Deaths/100,000 |

Among the respiratory diseases as cause of death, malignant neoplasms and pneumonia were significantly higher in Milwaukee County.

Since age, sex, ancestry, industrial exposure, living conditions, alcohol ingestion, smoking habits, etc., are involved, these statistics do not prove or disprove the higher levels of some air pollutants in Milwaukee County has any effect, one way or another. Since the time of this study, both suspended particulates and sulfur oxides seem to be declining in Milwaukee County.

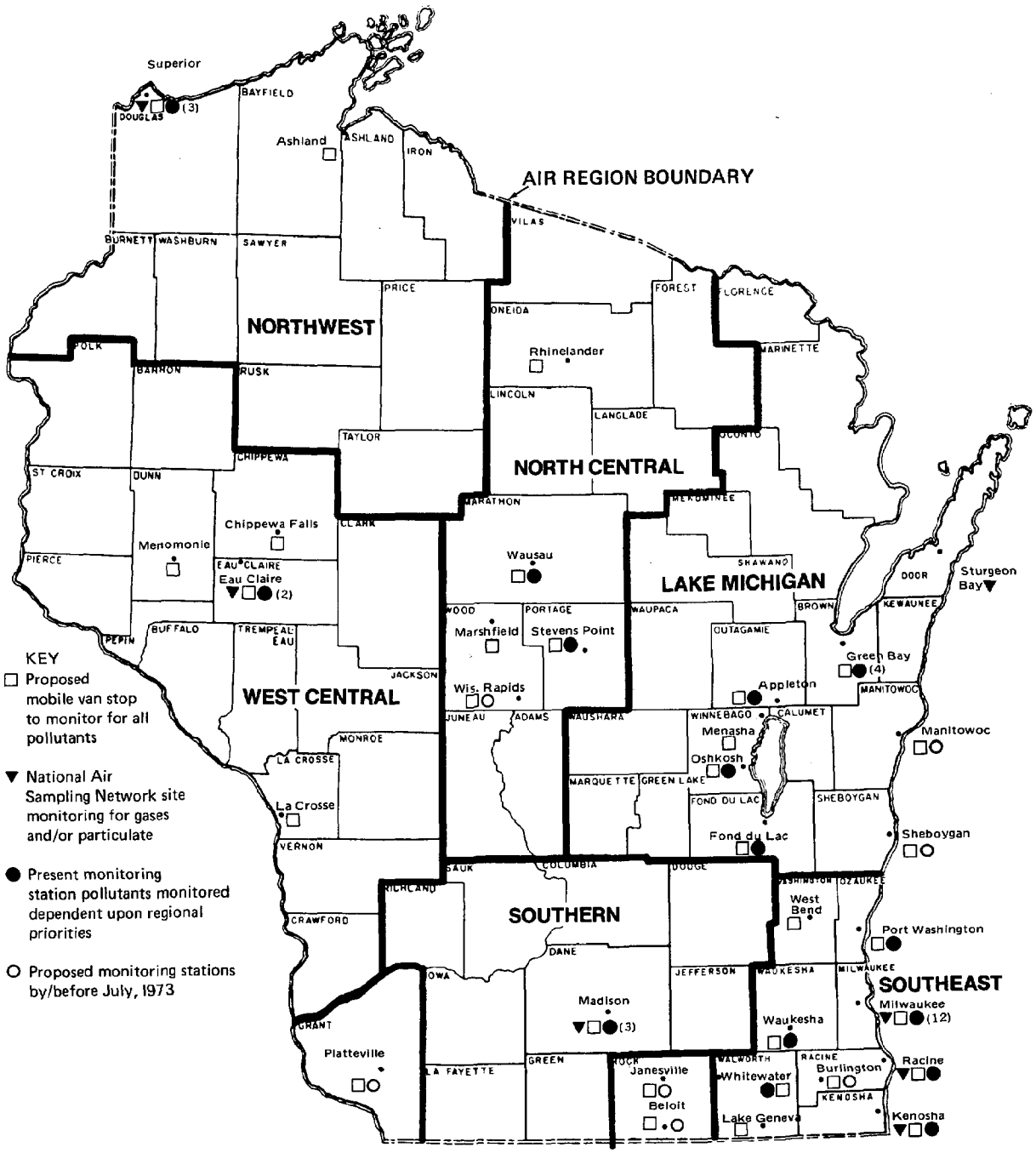
County and regional programs commenced since 1968 include Eau Claire, Douglas, and Racine Counties. The Milwaukee County program has been in operation since 1948.

Property tax relief requests under Section 70.11 (21), Wisconsin Statutes, recommended for approval totalled $12,250,000 in 1972.

**SELECTED CAUSES OF DEATH**
**MILWAUKEE COUNTY AND BALANCE OF STATE**
**FIVE-YEAR AVERAGE NUMBER AND RATE, 1963 – 1967**

| Cause of Death | I.C.D.[1] | Milwaukee Co. Five Year Avg. | | Balance of State Five Year Avg. | | Total Five Year Avg. | |
|---|---|---|---|---|---|---|---|
| | | Number | Rate | Number | Rate | Number | Rate |
| Neoplasms of pharynx | 145-148 | 22 | 2.1 | 36 | 1.2 | 58 | 1.4 |
| Mal. Neoplasms of Respiratory System | 160-165 | 315 | 29.5* | 630 | 20.4 | 945 | 22.8 |
| Heart Disease (All Forms) | 410-443 | 3,894 | 364.8** | 12,092 | 391.9 | 15,966 | 384.5 |
| Arterio. & Degenerative Heart Dis. | 420-422 | 3,401 | 318.6** | 10,509 | 340.6 | 13,910 | 334.9 |
| Acute Respiratory Infections | 470-475 | 3 | – | 10 | – | 13 | – |
| Influenza | 480-483 | 8 | – | 67 | 2.2 | 75 | 1.8 |
| Pneumonia | 490-493 | 385 | 36.0* | 733 | 23.8 | 1,117 | 26.9 |
| Bronchitis | 500-502 | 14 | – | 44 | 1.4 | 58 | 1.4 |
| Emphysema | 502.0 & 527.1 | 106 | 10.0 | 275 | 8.9 | 381 | 9.2 |
| Other Diseases of Respiratory System | 510-527 | 147 | 13.8 | 386 | 12.5 | 533 | 12.8 |
| Infections of skin & subcutaneous tissue | 690-698 | 4 | – | 7 | – | 11 | – |

*Rates per 100,000 population that are significantly higher for Milwaukee County (95% confidence)
**Rates per 100,000 population that are significantly lower for Milwaukee County (95% confidence)
Crude death rates may only reflect differences in the age distribution of the population.
[1]International Classification of Diseases, World Health Organization.


AIR REGION BOUNDARY
NORTHWEST
NORTH CENTRAL
LAKE MICHIGAN
WEST CENTRAL
SOUTHERN
SOUTHEAST
Superior
Ashland
Rhinelander
Chippewa Falls
Menomonie
Eau Claire
Wausau
Sturgeon Bay
Marshfield
Stevens Point
Wis. Rapids
Appleton
Green Bay
Manitowoc
Menasha
Oshkosh
La Crosse
Fond du Lac
Sheboygan
West Bend
Port Washington
Madison
Waukesha
Milwaukee
Platteville
Janesville
Beloit
Whitewater
Burlington
Racine
Lake Geneva
Kenosha
KEY
Proposed mobile van stop to monitor for all pollutants
National Air Sampling Network site monitoring for gases and/or particulate
Present monitoring station pollutants monitored dependent upon regional priorities
Proposed monitoring stations by/before July, 1973

## *Problems*

The present level of state program activity does not adequately support the multiplying federal requirements of EPA for hearings, record keeping, reporting, surveillance, and related activities. Many federal administrative requirements impede the prompt and orderly correction of point sources, which is a principal objective in achieving improved air quality.

County response to voluntarily undertaking air pollution programs under Section 59.07 (85) has been discouraging, leaving a void in regulation of small sources, nuisances, and local problems, which can best be managed by local programs, and for which the state program does not have appropriate legal enforcement mechanism or resources.

Odor control from animal feed lot wastes is a problem for which corrective operating procedures and technology are not adequate.

The tax exemption statute for pollution abatement facilities, State Statute 70.11 (21), is inequitable in that a person installing a new, totally closed loop system which discharges no pollutants receives no compensation while the person employing a less technologically advanced system which must have its discharges controlled will receive relief on his pollution removal expenditures.

The tax exemption statute remains difficult to administer and encourages the continuation of wasteful and inefficient processes rather than substitution of efficient processes.

In the absence of planning and properly enforced land use controls on an areawide basis, air pollution will continue to cause problems, especially in residential areas contiguous to industrial zones and transportation corridors. Buffer zones which take into account terrain features and meteorological factors are needed to prevent future difficulties.

The errors inherent in the federally prescribed Jacobs-Hochheiser method have left us with a nitrogen dioxide air standard to achieve, but no acceptable method to determine ambient concentrations.

## *Laws*

Section 144.30-144.42, Wisconsin Statutes, the statewide comprehensive air pollution control program stresses a joint state and local government effort in which development of countywide programs are specifically encouraged.

Section 59.07 (53) authorizes a Milwaukee County control program.

Section 59.07 (85) authorizes a countywide control program.

Section 66.052 authorizes municipalities to regulate offensive industries.

Section 144.41 requires counties to consult with municipalities prior to establishing a county program.

Section 144.54 requires the Department to monitor discharges of air contaminants and toxic and hazardous substances through annual reports and payment of fees by private emitters.

Section 146.14 authorizes local health officers to abate air pollution.

Sections 280.01 and 280.02 authorize government or individuals to undertake recovery of damages from public nuisances.

## *Recommendations*

1. Further increases in program activities to meet federal requirements for regulation, data gathering, and reporting, and new pollutants to be regulated such as mercury, asbestos, and beryllium, increased air quality monitoring and stack testing capability, and administration of the monitoring fees will require more personnel and equipment.

2. Land use controls including protective air pollution considerations for industrial, commercial and residential developments, and for transportation systems should be instituted throughout the entire state, subject to state review and approval.

3. Section 70.11 (21), Wisconsin Statutes, tax exemption for pollution abatement facilities should be clarified and made more equitable, including legislative guidelines.

4. The state should take over responsibility for control of all major air pollution sources in Wisconsin. Counties and other local units of government should limit their activities to control of small sources such as backyard and leaf burning and local nuisances.

5. Funds should be appropriated for a study of suppression of feed lot animal waste odors and additional research should be done if appropriate.

6. A noise pollution control program should be established by statute to implement requirements of federal law and to establish rules to control sources of ambient noise in Wisconsin.

## *Regulations*

Air pollution control rules, Administrative Code NR 154, establishes emission limits, emergency procedures, plan requirements to control new or modified sources, standby fuel restrictions, maintenance of motor vehicles, and the role assigned county and regional programs in control and enforcement of minor sources.

Ambient air quality, Administrative Code NR 155, establishes statewide air quality standards, and designates 8 air quality control regions.

Discharge of radioactive byproduct material to the atmosphere is controlled by the United States Atomic Energy Commission, Part 20, Title 10, Federal Register.

Noise is not enumerated as an air contaminant by state law and is not controlled by the Department.

## *What Is Being Done*

The location of numerous small sources in the Southeastern Air Region subject to regulation under the control rules, NR 154, revised April 1, 1972, is proceeding, along with updating of emission data on large sources on computerized basis. The emissions inventory is being expanded to include toxic and hazardous substances.

Individual emergency episode control plans for large emitters are being developed.

Significant new sources are subjected to an analysis for air quality impact prior to plan approval.

The air quality surveillance network is being expanded to include 9 continuous monitoring sites in the Southeastern Air Region, and 2 mobile monitoring units. Plans have been made for electronic data reduction from continuous instruments to provide real time information.

A stack testing capability is being developed.

A program for regular automotive idle tuneup and minor maintenance by owners is being developed.

A means to provide grant or subsidy for conversion of coal fired residential heating plants in the Southeastern Air Region to another fuel for those who would suffer economic hardship is being explored.

Rules for reporting and monitoring fee schedules under Section 144.54, State Statutes, are being developed.

Although noise is not now a responsibility of the Department, progress in noise abatement and regulation is being monitored as part of the air pollution control program.

## *What Is Not Being Done That Should Be Done*

With four exceptions, counties have failed to assume this obligation. The voluntary role of county control programs under state law must be redefined, and decisions made on their future role, including funding, before the state program can proceed on a meaningful course in 68 counties so far as small sources, and local nuisances and problems are concerned.



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